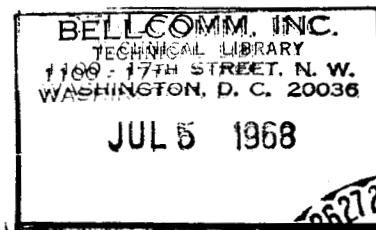


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THERMAL PERFORMANCE QUALIFICATION TEST  
OF THE ENVIRONMENTAL CONTROL SYSTEM  
BLOCK I RADIATOR SYSTEM

ATR 351014

CTR 01211727

ATR 351049

13 July 1966



Contract NAS9-150, Exhibit "I", Paragraph 5.5.12

Prepared by

M. Filler - Responsible Engineer  
A. O. Males - Test Engineer

Approved by

*D. K. Bailey*

D. K. Bailey, Director  
Laboratories and Test



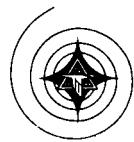
NORTH AMERICAN AVIATION, INC.  
SPACE and INFORMATION SYSTEMS DIVISION

(NASA-CR-129895) THERMAL PERFORMANCE  
QUALIFICATION TEST OF THE ENVIRONMENTAL  
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A.O. Males, et al (North American  
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**SPACE and INFORMATION SYSTEMS DIVISION**

## TECHNICAL REPORT INDEX/ABSTRACT

ACCESSION NUMBER					DOCUMENT SECURITY CLASSIFICATION UNCLASSIFIED	
TITLE OF DOCUMENT THERMAL PERFORMANCE QUALIFICATION TEST OF THE ENVIRONMENTAL CONTROL SYSTEM BLOCK I RADIATOR SYSTEM (FINAL REPORT)						LIBRARY USE ONLY
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ABSTRACT
A QUALIFICATION TEST PROGRAM WAS CONDUCTED TO PROVIDE ASSURANCE THAT THE ENVIRONMENTAL CONTROL SYSTEM (ECS) BLOCK I RADIATOR SYSTEM WOULD SATISFY THE ESTABLISHED THERMAL PERFORMANCE REQUIREMENTS. THE TWO RADIATORS ARE USED TO RADIATE INTO SPACE THE EXCESS HEAT OF THE ECS WHICH IS TRANSFERRED TO THE RADIATORS VIA THE WATER-GLYCOL COOLANT LOOP.  THIS TEST REPORT DESCRIBES THE RADIATOR TEST SPECIMEN ASSEMBLY AND THE ASSOCIATED TEST SYSTEM USED TO SIMULATE THE VARIOUS MODES OF OPERATION EXPECTED DURING AN ACTUAL APOLLO MISSION. DURING ALL TEST RUNS, THE FLOW RATES, TEMPERATURES, PRESSURES, AND POWER WERE CONTROLLED AND/OR MONITORED AND RECORDED. ALL TEST RUNS WERE MADE IN A LARGE HIGH-VACUUM CHAMBER EQUIPPED WITH A CRYOGENIC SHROUD AND AN INFRARED LAMP ARRAY.  THE RADIATOR SYSTEM SATISFACTORILY MET OR EXCEEDED ALL ITS THERMAL PERFORMANCE REQUIREMENTS.



## FOREWORD

A thermal performance qualification test program has been successfully completed for the Apollo Block I environmental control system space radiators and the associated radiator fluid system. The test program was conducted by the Thermal and Environmental Control Systems Group of the Laboratories & Test Department in accordance with Test Request 351014.

In addition, a series of supplemental thermal performance tests were conducted at the same time in accordance with Test Request 351049. All test runs were conducted at the General Electric Company's Valley Forge Facility. The test setup included the installation of the radiator system in a vacuum chamber 39 feet in diameter.



## SUMMARY

A thermal-vacuum test program was conducted to provide the data necessary to qualify the Apollo environmental control system (ECS) Block I radiator system. The tests were accomplished with the radiators installed in a chamber maintained at vacuum conditions and cooled by a cryogenic shroud. A total of 50 test runs (41 for the qualification test program and nine for the supplemental test program) was made under certain external heat loads, at certain coolant temperatures and coolant flow rates, and in certain radiator system valve positions. This allowed verification of the radiator system thermal performance during simulations of the various modes of operation possible during the Block I mission and, in addition, permitted a variety of off-design testing.

The radiator system satisfactorily met the thermal performance requirements of the applicable test specification.



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## INTRODUCTION

A qualification test program was required to provide assurance that the environmental control system (ECS) Block I radiator system could meet its established thermal performance requirements. The two radiators which form part of the external surface of the Apollo service module are designed to radiate into space the excess heat of the ECS. This process is accomplished by circulating the water-glycol fluid cooled by the radiators in a closed loop system, thereby providing thermal control for the suit and cabin atmosphere, and for the spacecraft electronic equipment by means of the cold plate network.

The test specimen consisted of two separate radiators, each consisting of two interconnected panels. In addition to the radiator panels, four spacecraft isolation valves, four spacecraft check valves, one spacecraft temperature control valve, and the required interconnecting tubing were included in the radiator system flow circuit.

In order to simulate the thermal cold-sink of space and the radiant external heat loadings of the earth and sun, the radiator system test specimen was placed in a vacuum chamber and surrounded by a high-emissivity cryogenic shroud and an array of high-intensity infrared lamps. This permitted the simulation of the various positions of the radiators in relation to the earth and the sun and, simultaneously, the simulation of the expected internal heat loads transferred to the radiator by the water-glycol coolant loop. In simulating the transient conditions of the expected mission profile some of the test runs were performed with the external and internal heat loads varying according to a specified heat input versus time schedule.

The radiator system test specimen and the associated water-glycol closed loop circulation system were assembled and instrumented by the Thermal and Environmental Control Systems Group of the Laboratories & Test Department. These items were then packaged and shipped to the General Electric Space Technology Center, Valley Forge, Pennsylvania, where the test runs were performed.

A total of 41 test runs in the series of 1 through 53 was completed during the qualification test program. (Twelve other scheduled test runs were deleted because on-site evaluations by Apollo Engineering indicated that they were no longer necessary.) In accordance with NAA Specification MA0411-0005, the official qualification criteria for the radiator system's



thermal performance were based on its heat-rejection capability demonstrated during Test Runs 6, 7, and 8. In addition to the qualification test program (Test Request 351014), a series of supplemental tests (Test Request 351049) were performed, utilizing the same test specimen, equipment, and instrumentation. The nine supplemental tests (identified as Test Runs 54 through 62) were conducted to evaluate the radiator system's thermal performance under unusually severe operating conditions, which included an inoperative spacecraft water-glycol evaporator.

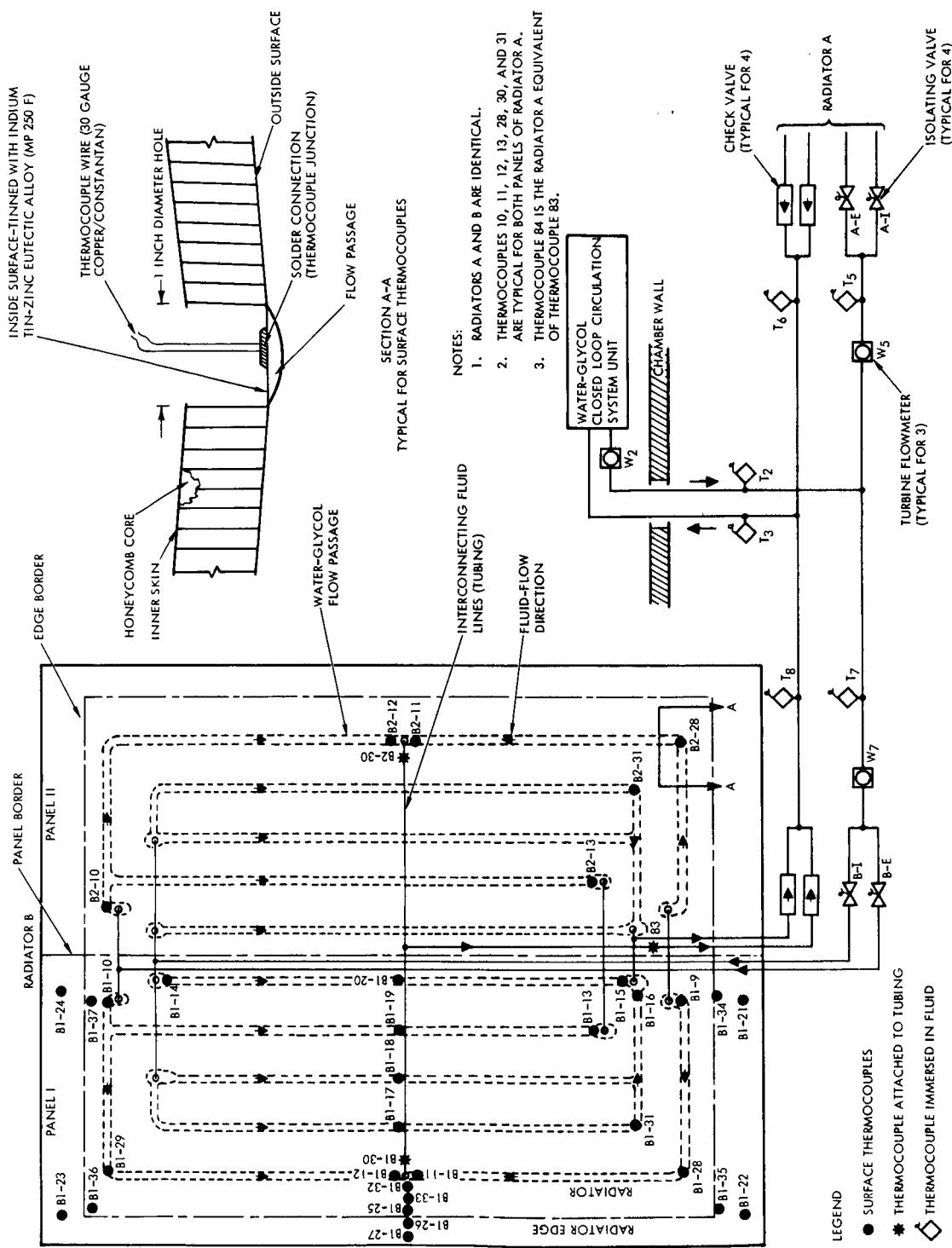


## I. TEST SPECIMEN

The test specimen consisted of a set of ECS Block I radiator panels (NAA Drawing V17-615001) combined with their bonded honeycomb structural backing, inner sheet metal skin, connecting fluid plumbing, and peripherally attached edge strips (NAA Drawing V17-961502 for the combined specimen assembly). The two radiators were identified as Radiator A (NAA S/N AAD 4064) and Radiator B (NAA S/N AAD 3555). The edge strips were 15-inch wide sections of service module wall structure. These strips completely surround, and were attached to, the periphery of each radiator (in the same manner as on the spacecraft). The edge strips were made a part of the test specimen because the thermal conduction interaction between the radiators and the surrounding service module structure has a significant effect on the radiator system thermal performance.

As shown in Figure 1, each radiator was divided into two identical arrangements of coolant-flow passages with the resultant halves of the radiators identified as panel I and panel II (or for complete identification, radiator panels A-I, A-II, B-I, and B-II). The exterior surfaces of the radiator panels were coated with NAA Apollo ECS white inorganic radiator coating (NAA Specification MB0125-31), and the exterior surfaces of the edge strips were coated with NAA aluminum coating (NAA Specification MB0125-040). These coatings produced a radiator surface emissivity of 0.92 and a solar absorptivity of 0.20, a radiator edge emissivity of 0.27 and a solar absorptivity of 0.27.

Forty-six, 30-gauge, copper/constantan thermocouples were fabricated and attached to the radiator panels and edges at the locations shown in Figure 2. Twenty-two thermocouples were located in radiator panel B-I, six in the edge strips surrounding B-I, and six each in radiator panels B-II, A-I, and A-II by drilling one-inch diameter holes through the inner skin and the honeycomb structural backing. The thermocouples were then soldered onto the inner surface of the radiator panels and the edge strips. Figures 3 and 4 show the inside views of Radiators B and A, respectively, after thermocouple installation but before mating of the two radiators. A special indium-tin-zinc eutectic alloy was used to prepare the aluminum panel surfaces for the soldering so as to produce a thermocouple connection as shown in Section A-A of Figure 1. In addition, six thermocouples were attached directly to the external surfaces of the interconnecting aluminum tubing at the locations identified in Figure 2. After installation an electrical continuity test was made to assure that each thermocouple was grounded to its respective radiator panel.



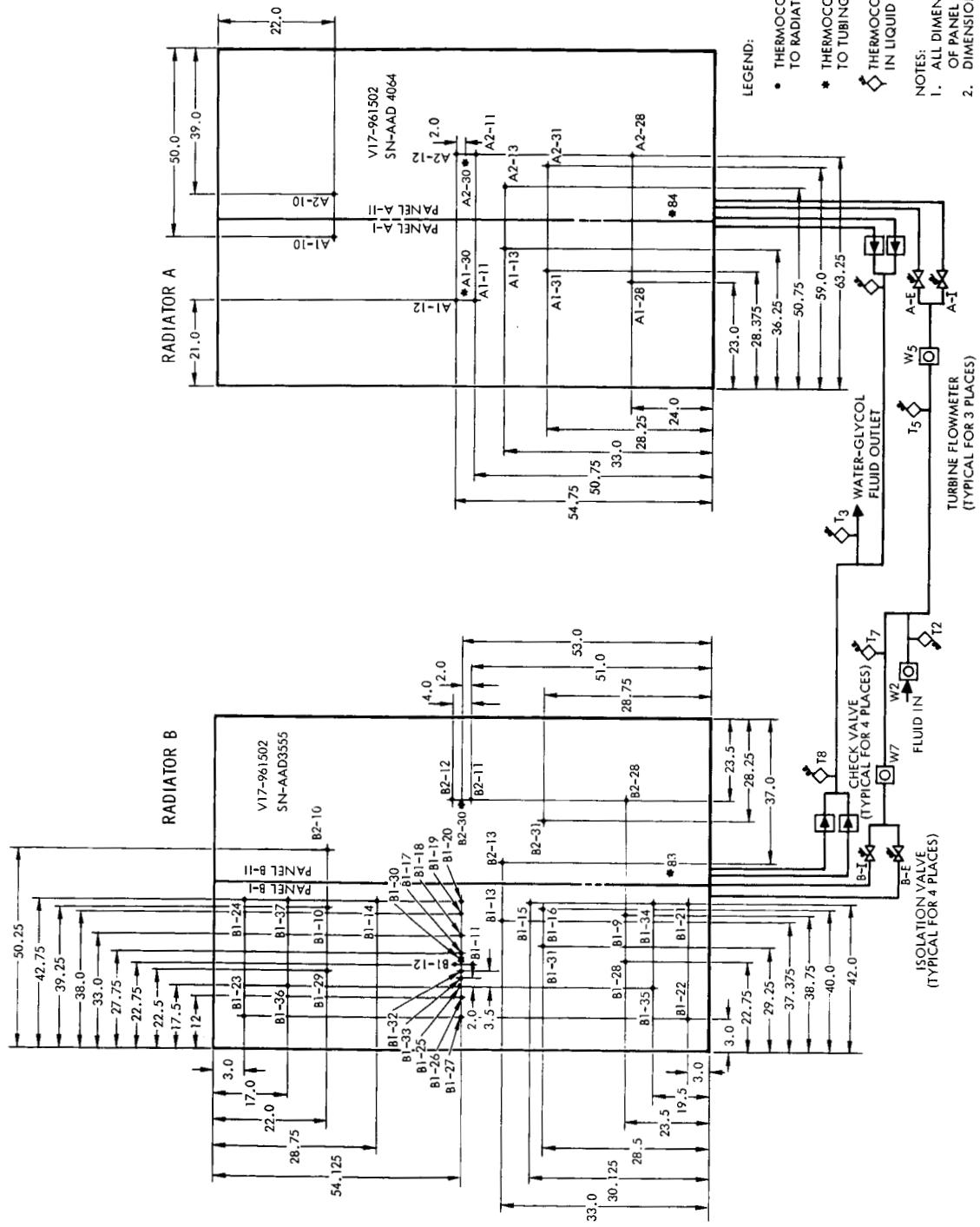
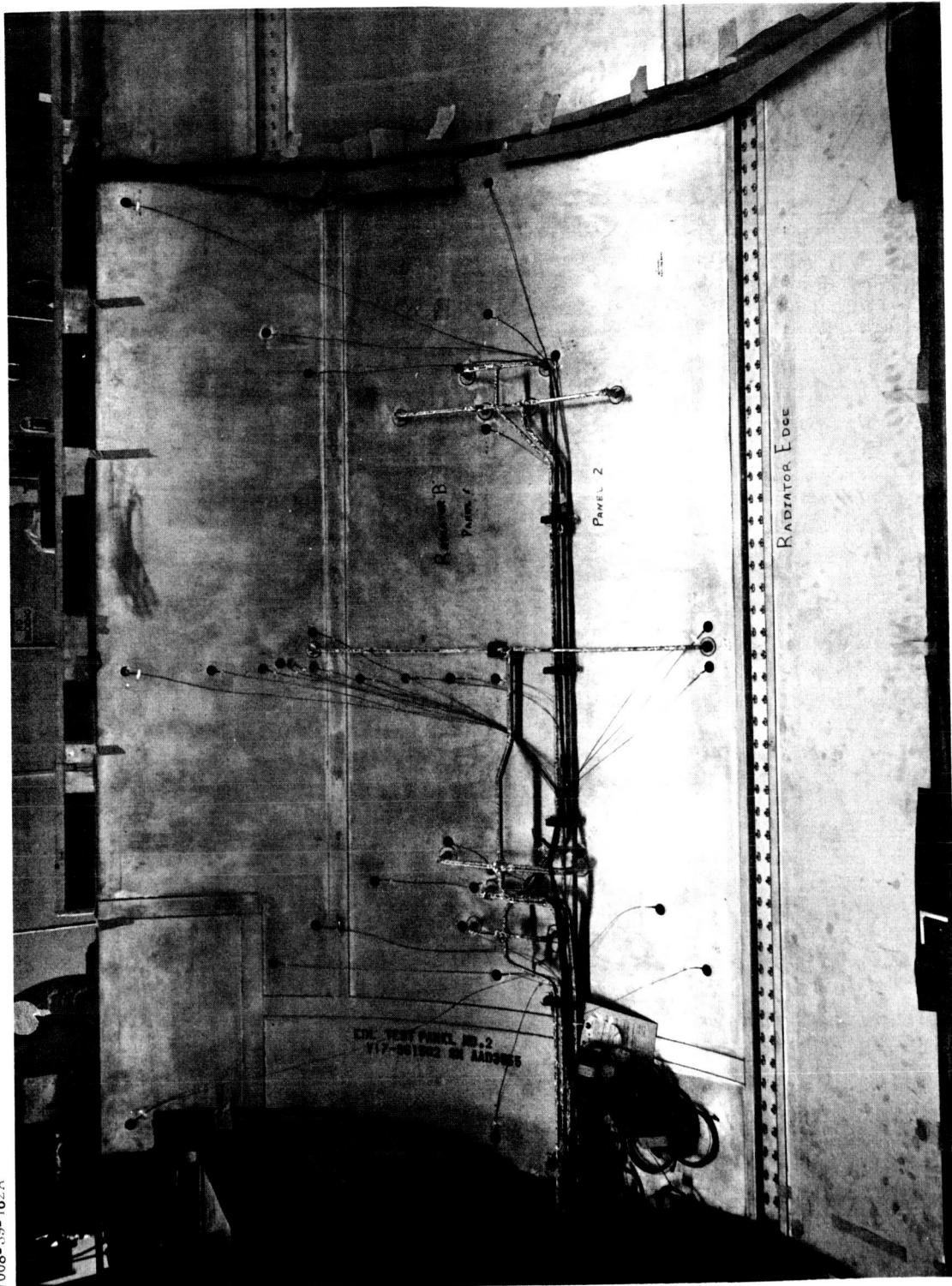
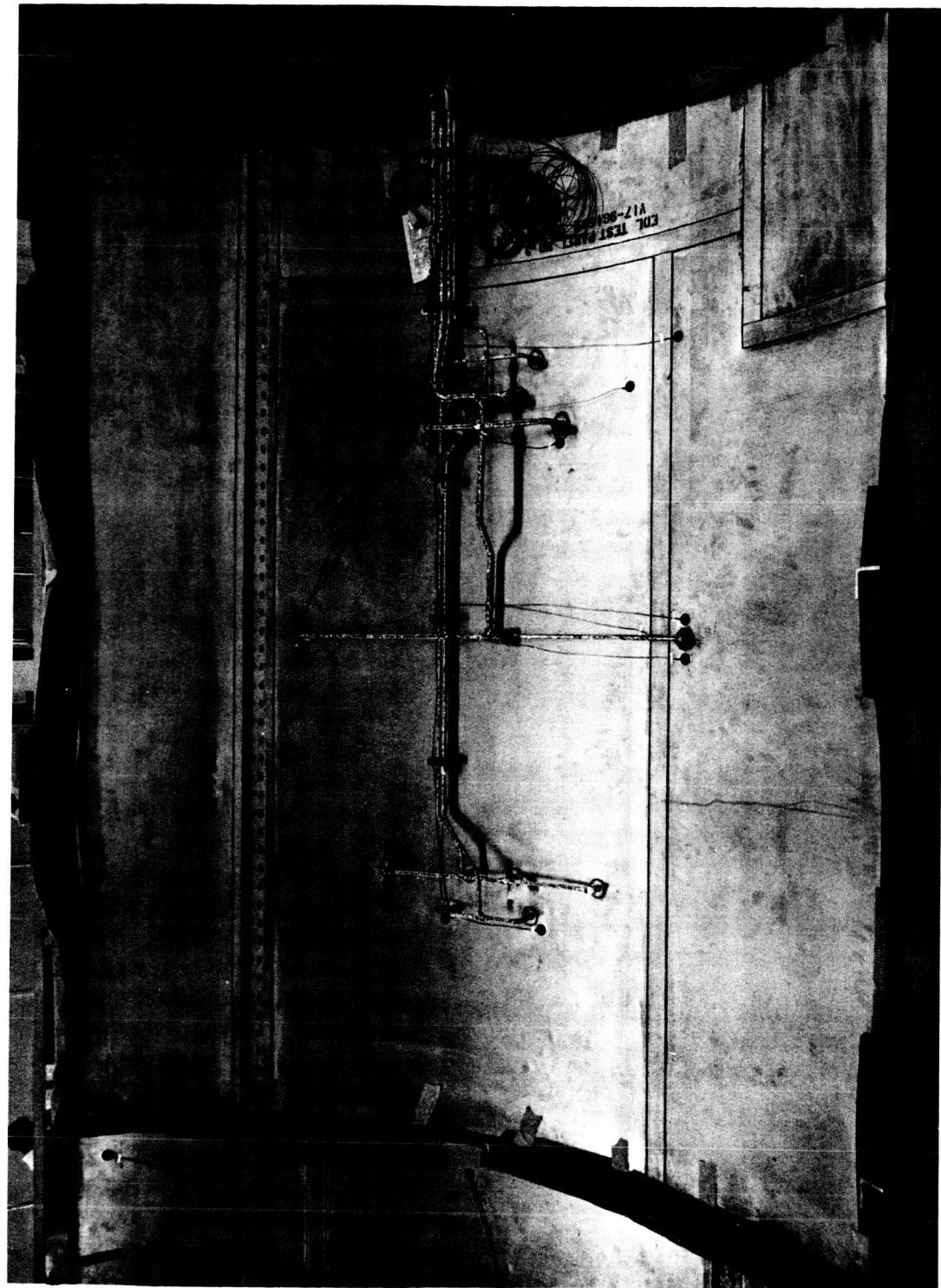


Figure 2. Schematic of Thermocouple Locations



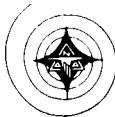
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Figure 3. Inside View of Radiator B Before Assembly



7008-39-162B

Figure 4. Inside View of Radiator A Before Assembly



The radiators were connected into the water-glycol coolant loop, as on the spacecraft, through four isolation valves located on the radiator inlet side and through four check valves located on the radiator outlet side. As shown in Figure 1, six thermocouples and two flow meters were installed directly in the water-glycol lines of the test specimen assembly so as to sense the fluid temperatures and flow rates at certain critical locations.

In order to simulate the spacecraft orientation of the radiators and to provide for the holding of the test specimen assembly in the vacuum chamber, the radiators were mounted in, but insulated from, a specially built test fixture. Most of the connecting fluid lines and all of the radiator valves were located within the test fixture, between the two radiators, for thermal isolation of the valves and lines from the cryogenic shroud and the infrared-lamp array of the vacuum chamber. A 40-layer blanket of aluminized Mylar insulation was placed over the inside surfaces of the radiators, as well as over the valves and connecting fluid lines, so as to eliminate radiator-heat transfer between the inside surfaces of the radiators, the radiator plumbing, and the vacuum-chamber shroud and lamps. Figure 5 shows the complete test specimen assembly (with a plastic cover protecting the coated surfaces) during a pretest checkout.

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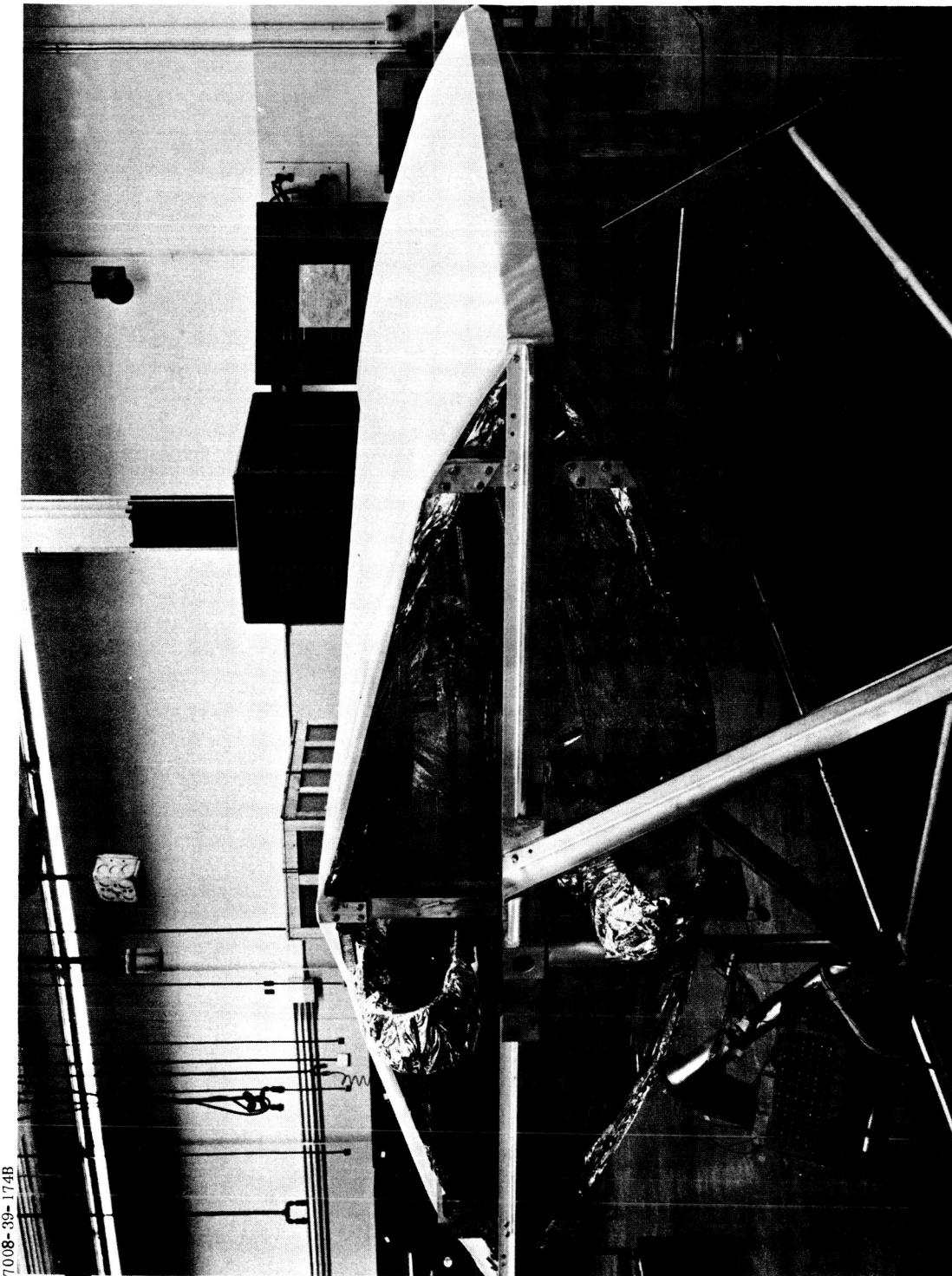


Figure 5. Complete Test Specimen Assembly During a Pretest Checkout

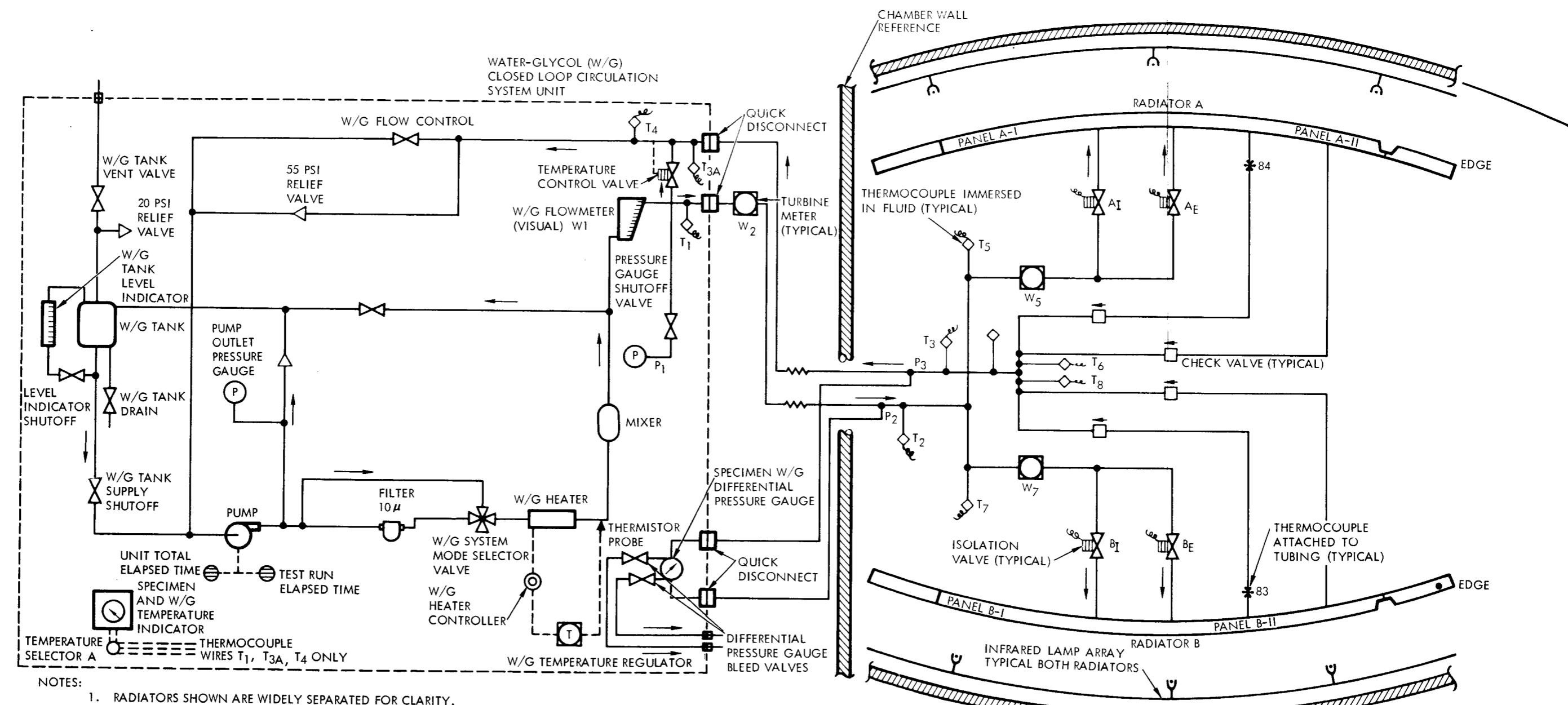


## II. TEST SYSTEM

The complete test system, shown in Figure 6, was assembled in order to provide the required test conditions. The test specimen section of the test system was installed in a 39-foot diameter spherical vacuum chamber located at the General Electric Company's Valley Forge Space Technology Center, King of Prussia, Pennsylvania. The chamber's liquid-nitrogen-cooled shroud maintained temperatures of  $-300 \pm 20$  F over its entire surface, with an emissivity of approximately 0.95. The chamber contained an infrared lamp array consisting of 84, 3-inch long, 500-watt quartz lamps mounted approximately 15 inches from each other and 8 inches from the radiator surfaces for the simultaneous irradiation of both radiators. (Each radiator was allowed 42 lamps.) The setup was arranged to produce minimum blockage of the radiation-heat transfer between the radiators and the cryogenic shroud. The infrared array was sectioned and controlled in 16 separate zones through a 16-channel automatic power input programmer, shown in Figure 7. Figure 8 and 9 show the layout of the infrared lamps in relation to the radiator test specimen.

The water-glycol closed loop circulation system unit, shown as part of Figure 6, was used to circulate the water-glycol fluid at controlled temperatures, pressures, and flow rates, thereby simulating the fluid flow and thermal loading characteristics of the ECS. Figure 10 shows the circulation system unit during a pretest checkout. The water-glycol test fluid was a solution of  $62.50 \pm 0.50$  percent ethylene glycol and  $35.81 \pm 0.04$  percent distilled water by weight (prepared per NAA Specification MB0110-006, Type II).

For periodic recording of the test data, the General Electric Company provided a digital data acquisition system, shown in Figure 11, which recorded on punched paper tape. Conversion to engineering units was accomplished by means of the facility's computer network. A cross-bar analog recorder (K-Logger) was used to provide real-time plotting of most of the data on a number of  $3 \times 6$ -inch chart graphs. To obtain high-accuracy measurements of the critical fluid inlet to outlet differential temperatures, a precision hand potentiometer was used. The analog recorder and the hand potentiometer are shown in Figure 12. In addition, certain data points were obtained from the instrumentation of the circulation system unit and from a series of electrical power measuring meters and recorders. Table 1 details all the instrumentation used during the test runs.



## NOTES:

1. RADIATORS SHOWN ARE WIDELY SEPARATED FOR CLARITY.
2. DIFFERENTIAL PRESSURE BETWEEN T<sub>1</sub> LOCATION AND P<sub>2</sub> LOCATION WAS 3.25 PSID AT 200 LBS/HR AND 78 F.
3. DIFFERENTIAL PRESSURE BETWEEN T<sub>3A</sub> LOCATION AND P<sub>3</sub> LOCATION WAS 2.10 PSID AT 200 LBS/HR AND 78 F.
4. VACUUM PUMP SETUP FOR EVACUATION OF THE WATER-GLYCOL SYSTEM LINES IS NOT SHOWN.

Figure 6. Schematic of Test System

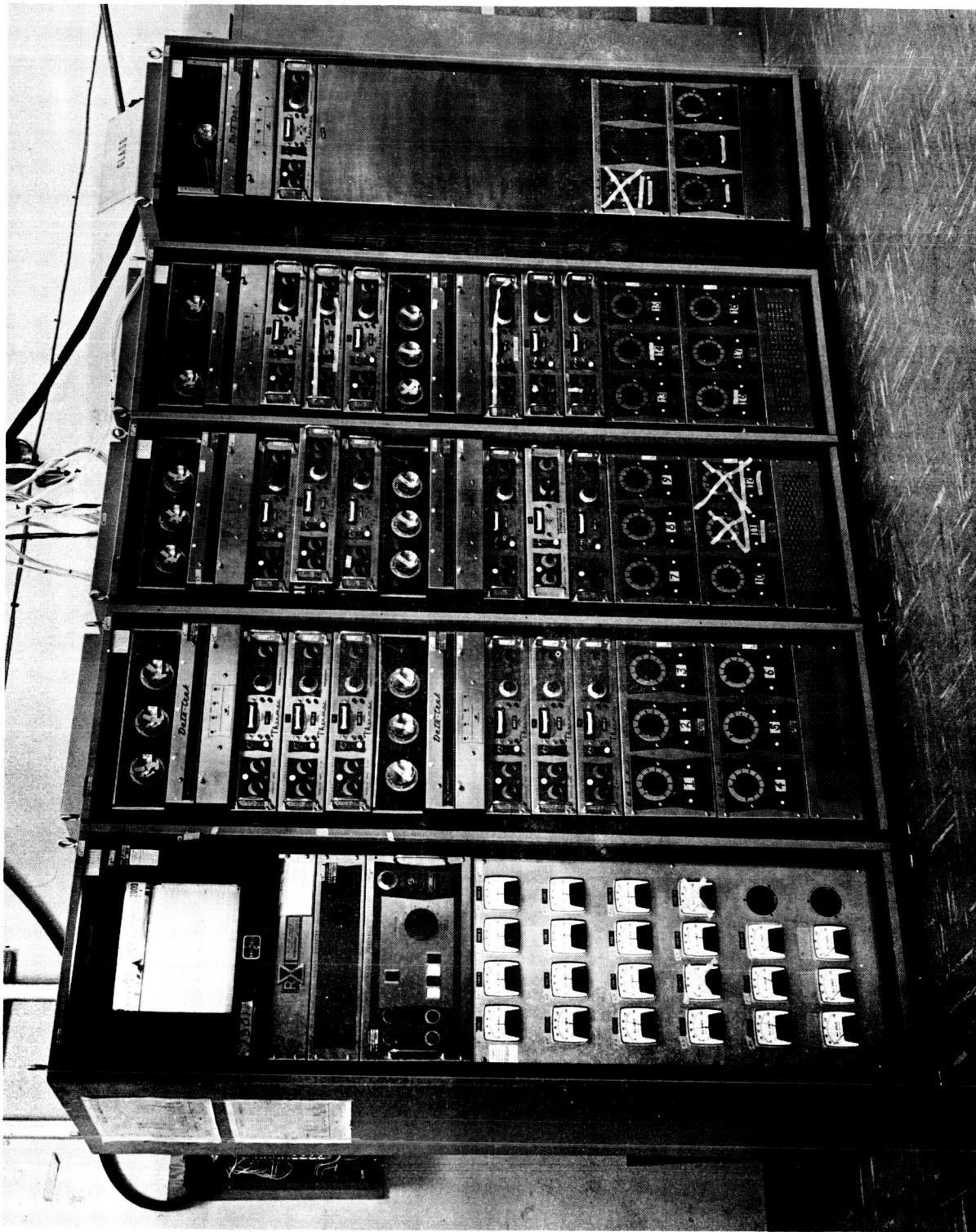


Figure 7. Automatic Power Programmer for Control of Infrared Lamp Array

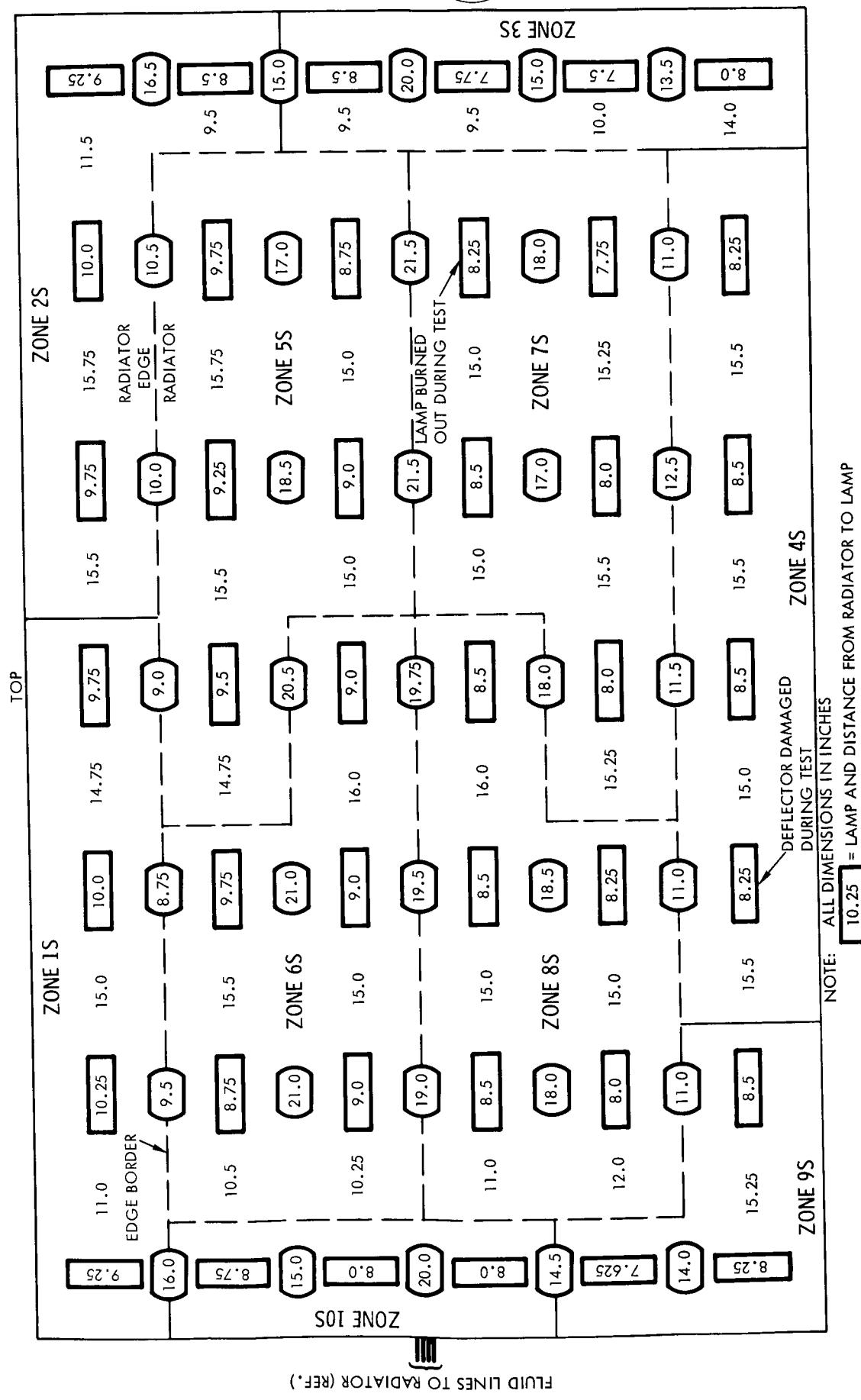


Figure 8. Schematic of Infrared Lamp Locations on Radiator A Side

(10.25) = LAMP AND DISTANCE FROM RADIATOR TO LAMP  
 (9.25) = VERTICAL DISTANCE BETWEEN LAMPS  
 OTHER DIMENSIONS SHOWN ARE HORIZONTAL DISTANCES BETWEEN LAMPS

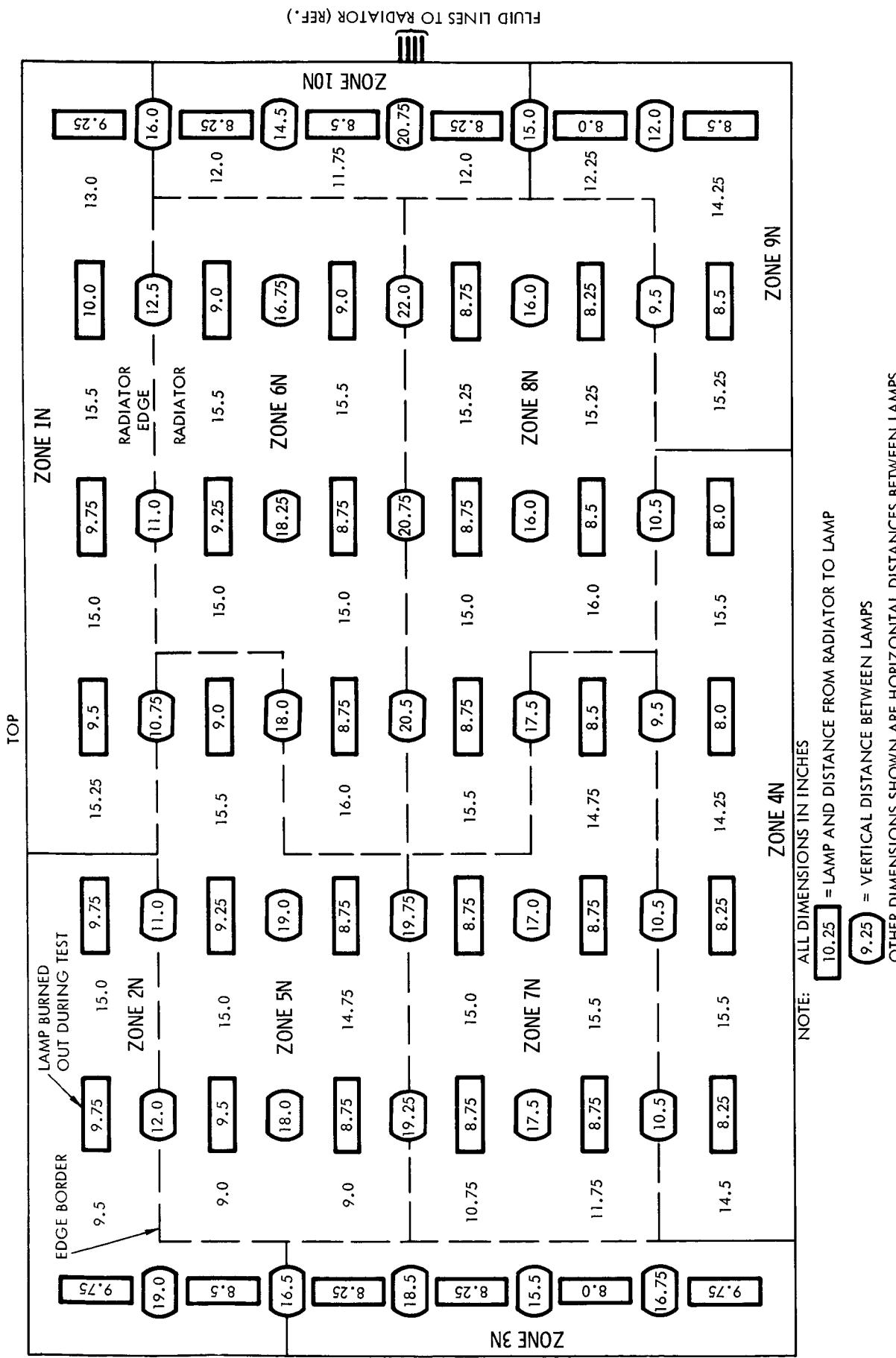


Figure 9. Schematic of Infrared Lamp Locations on Radiator B Side

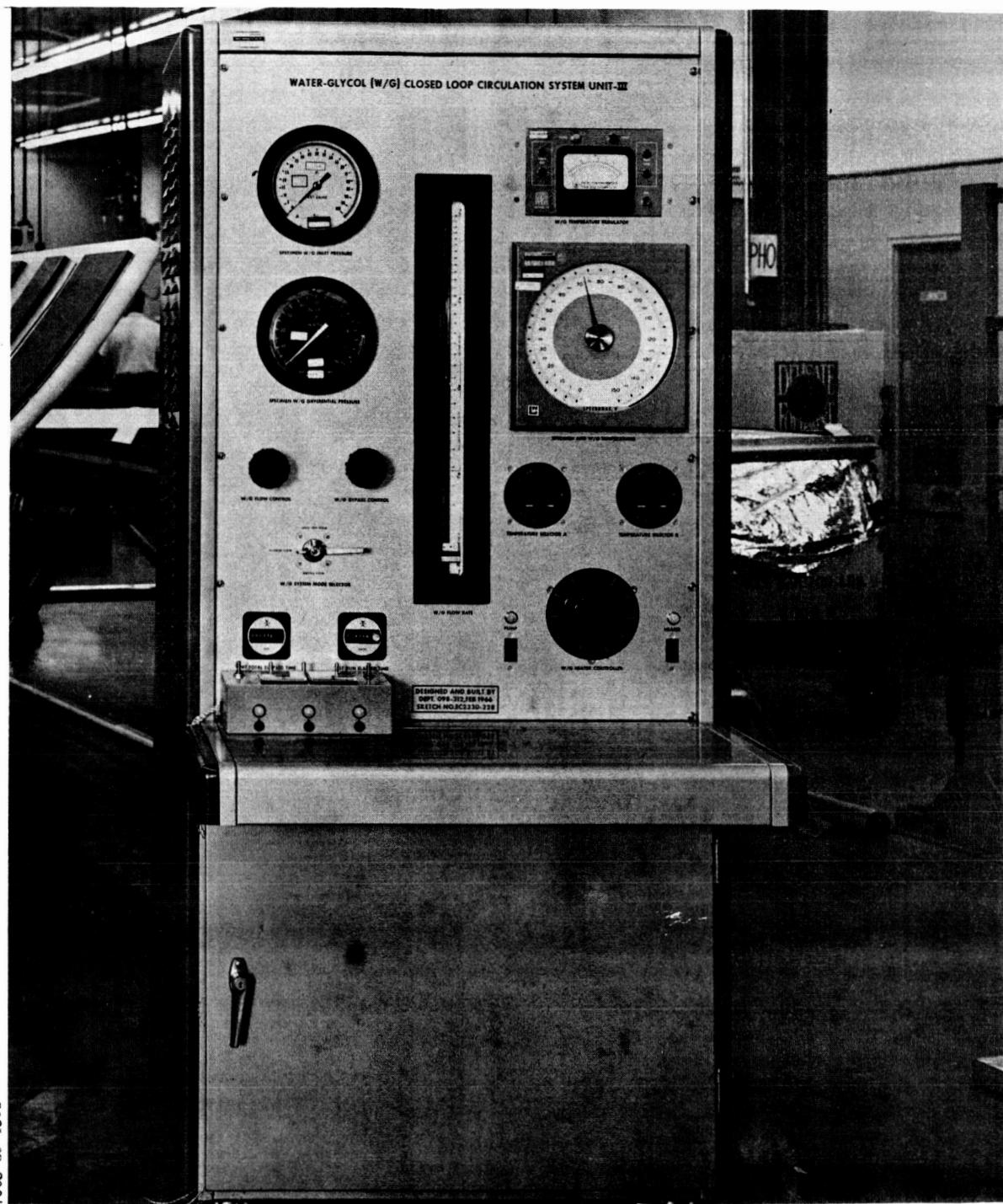


Figure 10. Water-Glycol Closed Loop Circulation System Unit

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Figure 11. Malta Digital Data Acquisition System and Computer Teletype

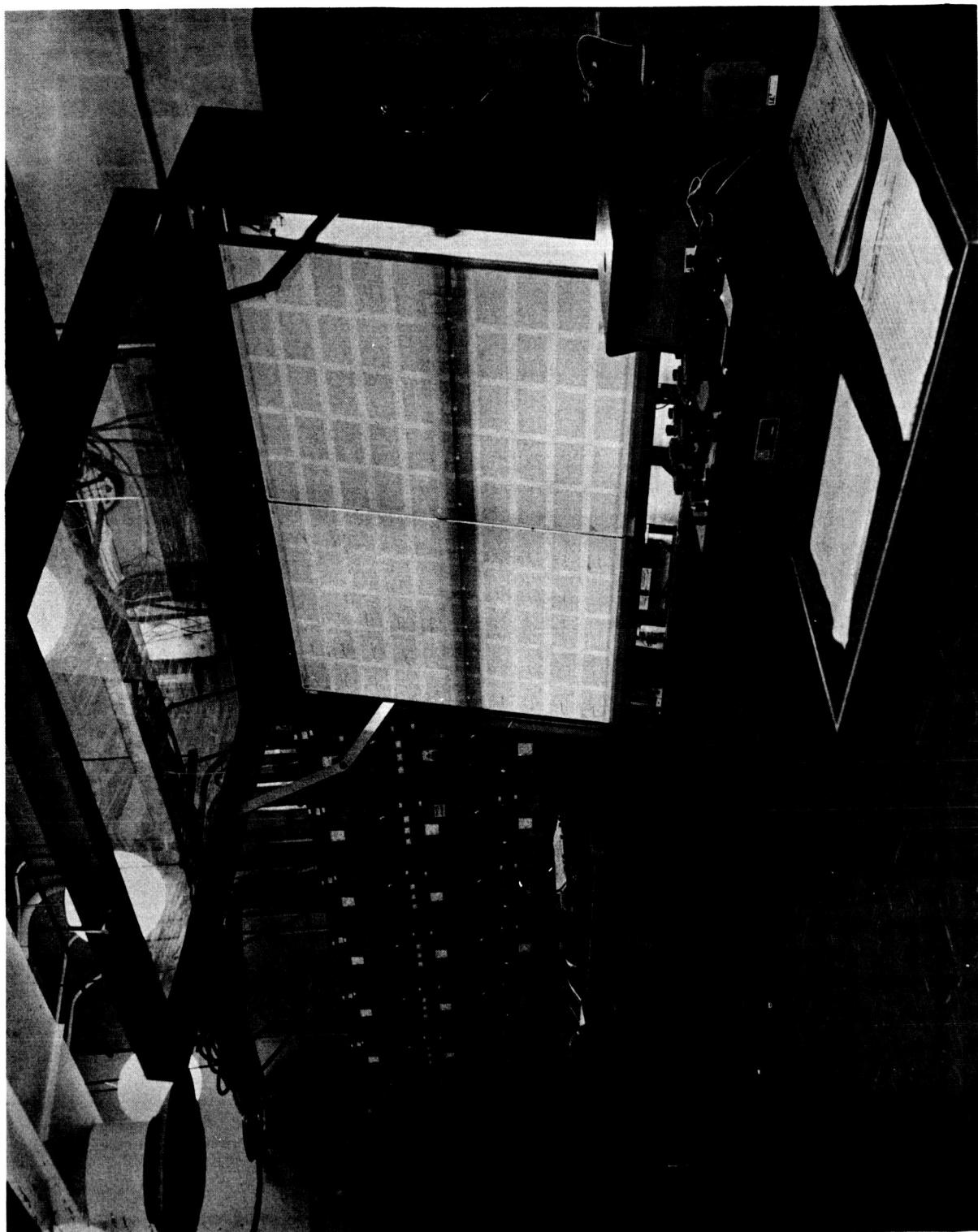


Figure 12. K-Logger Analog Recorder and Hand Potentiometer



Table 1. Test Instrumentation List

Nomenclature	Range	Accuracy	Manufacturer	Part Number	Used For*
Flowmeter (visual)	30-300 lbs/hr	± 1% FS	Fischer-Porter	10A0735M	W 1
Pressure gauge	0-100 psig	± 1/2% FS	Ashcroft	6-12179S	P 1
Differential pressure gauge	0-10 psid	± 1/2% FS	Barton	227	P <sub>2</sub> -P <sub>3</sub>
Temperature indicator	0 - 150 F	± 1/2 F	Leeds & Northrup	Speedomax R	T <sub>1</sub> , T <sub>3A</sub> , T <sub>4</sub>
Flowmeters (turbine)	50-500 lbs/hr	± 1/2% FS	Waugh	1/2-2-81T-3A1	W <sub>2</sub> , W <sub>5</sub> , W <sub>7</sub>
Thermocouple probes	-200 to +200 F	± 1/2 F	Temptron	316-062-T-1053	T <sub>1</sub> through T <sub>8</sub>
Vacuum gauge	10 <sup>-4</sup> to 10 <sup>-9</sup> Torr	± 5% FS	Consolidated Vacuum	GIC-100	Vacuum Chamber
AC ammeters	0-75 amperes	± 1/2% FS	General Electric	NE0068	IR power
AC voltmeters	0-300 volts	± 1/2% FS	General Electric	8AP	IR power
K-logger (analog)	Variable	1. 5% FS	Keinath	0178	All T's, W's, and P's
Potentiometer	0-10 millivolts	0. 01% FS	Minneapolis-Honeywell	2780	T <sub>2</sub> -T <sub>3</sub> , T <sub>5</sub> -T <sub>6</sub> , and T <sub>7</sub> -T <sub>8</sub>
Frequency meters	0-99999 cps	± 2% FS	Hewlett-Packard	5000CR	W <sub>2</sub> , W <sub>5</sub> , W <sub>7</sub>
Recorder	0-100%	± 1/2% FS	Bristol	0488	IR power
Malta digital acquisition system	0-10 millivolts	± 1/2% FS	General Electric	0475	All T's, W's, and P's

\*See Figure 6 for locations of W (flow rate), P (pressure), and T (temperature) instrumentation points.

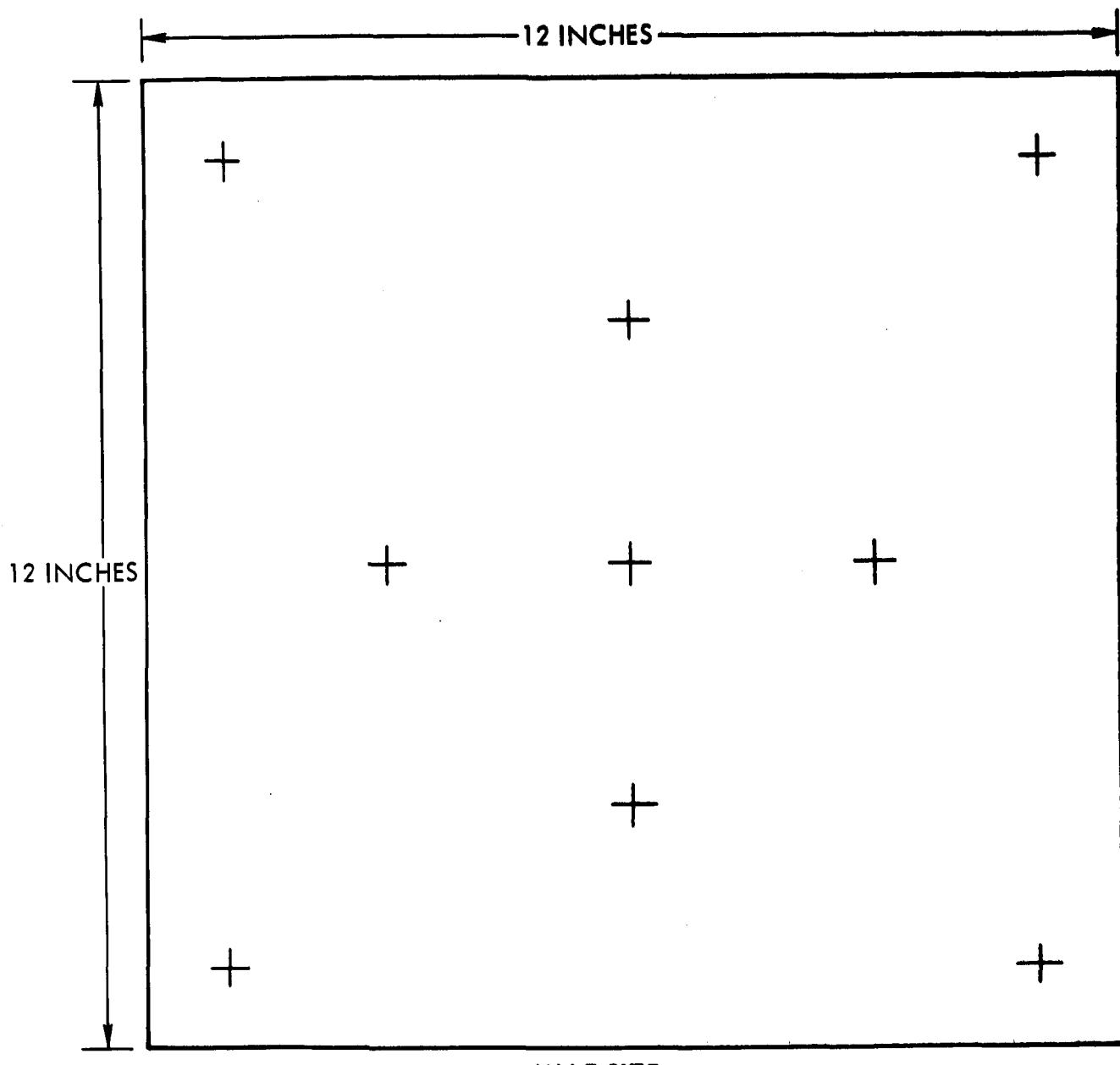


### III. TEST PROCEDURES

#### EXTERNAL HEAT INPUT CALIBRATION

In order to relate the external heat absorbed by the radiator panels and the radiator edges to the measured electrical power dissipated by the infrared lamp array, a series of calibrations was performed on one-foot square test samples. These samples were installed in a calibration test setup that essentially duplicated the thermal-vacuum environment to be experienced by any small segment of the full radiator specimen during the actual test runs. The infrared lamp array for this calibration test consisted of nine lamps (the same type as used for the test runs) spaced 15 inches apart in a structure similar to that used for the test runs. This nine-lamp array was positioned over the center of the calibration sample specimen and, by means of four thermally isolated mounting brackets, the array was located eight inches from the sample. As shown in Figure 13, the test sample was instrumented with nine thermocouples located symmetrically over the bottom surface of the sample (the surface facing away from the infrared lamps). A flat sheet of electrical resistance heater was then bonded to this back surface of the sample, thereby covering the thermocouples. The sample was placed on a 40-layer blanket of Mylar insulation which covered a one-half inch thick Texolite insulation board (assuring a thermally isolated test sample combination). The insulated sample was in turn placed on an aluminum base cooled by a series of liquid-nitrogen lines. Figure 14 schematically shows the complete calibration test specimen installed in a 5 x 5 foot-vacuum-test chamber which contained a liquid-nitrogen-cooled shroud.

The procedure used to calibrate a radiator panel test sample was three fold: 1) to establish a vacuum of less than  $1 \times 10^{-5}$  Torr in the vacuum chamber; 2) to cool the cold shroud and the sample base down to  $-300 \pm 20$  F; 3) to energize the resistance heater, and allow the sample thermocouples to stabilize (defined as that time when the temperature indication changed less than 4.0 F per hour). The electrical power heat, measured in watts, dissipated by the heater was assumed to have been completely absorbed by the radiator sample. This value was then converted into Btu/hr-ft<sup>2</sup> (1 watt = 3.41 Btu/hr-ft<sup>2</sup> for the one-foot square sample). The body temperature of the sample was considered as the average temperature of the nine thermocouples. The heater power was then turned off, and the body temperature of the sample was allowed to drop between 15 and 20 F. At this point the infrared-lamp array was activated and adjusted to produce the same



**NOTE: THERMOCOUPLES ARE  
ATTACHED TO THE BACK  
(UNDERNEATH) SIDE OF  
THE SAMPLES.**

Figure 13. Schematic of Thermocouple Locations on Samples Used for External Heat Input Calibration

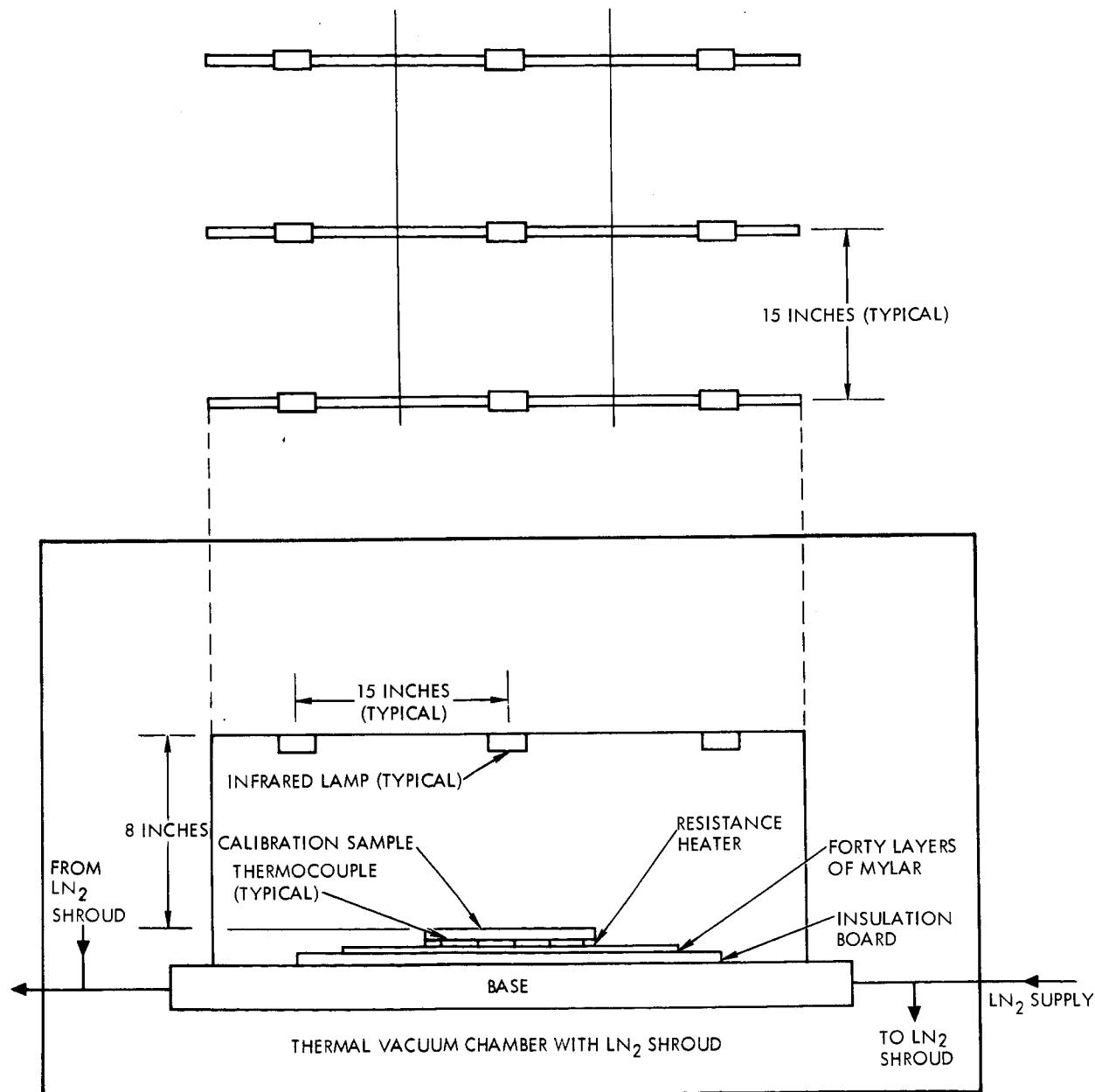


Figure 14. Schematic of Infrared Lamp Calibration Setup



stabilized body temperature as obtained with the resistance heater. With the body temperatures equalized, it was assumed that the electrical power dissipated by the infrared lamps could be directly correlated to the Btu/hr-ft<sup>2</sup> obtained with the heater. This process was repeated to obtain a number of values of absorbed heat so as to establish a curve for the radiator panel sample as shown in Figure 15. The entire calibration procedure was repeated for a one-foot square sample of the radiator edge to produce the curve shown in Figure 16. The validity of the curves shown in Figures 15 and 16 were confirmed by repeating the calibrations with different samples, with samples off-set beneath the lamps, and with lamps spaced 18.5 inches apart rather than the original 15-inch spacing.

#### PRETEST CHECKOUT

As shown in Figures 17 and 18, the complete radiator specimen assembly was lowered into the vacuum test chamber, and all interconnecting fluid lines, instrumentation lines, and electrical power lines were installed. A series of leak checks, instrumentation functional checks, and electrical continuity checks were performed in order to assure the integrity of the test specimen installation. The infrared lamp array was then aligned to the proper position on both sides of the radiators, and the lamps were functionally checked. Figures 19 and 20 show Radiators A and B respectively. The lamps are adjusted so that Figure 19 shows a condition of high radiator external heat input and low edge external heat input, while Figure 20 shows a condition of low radiator external heat input and high edge external heat input.

By use of a vacuum pump all the water-glycol system fluid lines including the radiator flow passages were evacuated. The pressure in the system was lowered to less than 500 microns and then, using the tank in the circulation unit, the system was filled with water-glycol fluid.

The circulation unit was activated to circulate the water-glycol fluid through the complete loop so as to functionally check all system components and instrumentation. At the conclusion of all pretest checkouts, the vacuum-chamber pumping system was started, and the chamber was evacuated to the required pressure. The chamber's cold shroud was then activated by a flow of liquid nitrogen. During all the subsequent test runs, the vacuum chamber was maintained at pressures of  $1 \times 10^{-6}$  Torr, or less, and the temperature of the shroud was maintained at -300±20 F.

#### TEST RUNS

The water-glycol circulation-system unit was adjusted to obtain a radiator inlet flow rate ( $W_1$ ) of 240 lbs/hr and a radiator inlet temperature ( $T_2$ ) of 95 F, as specified for Test Run 1 in Table 2. The infrared lamp array

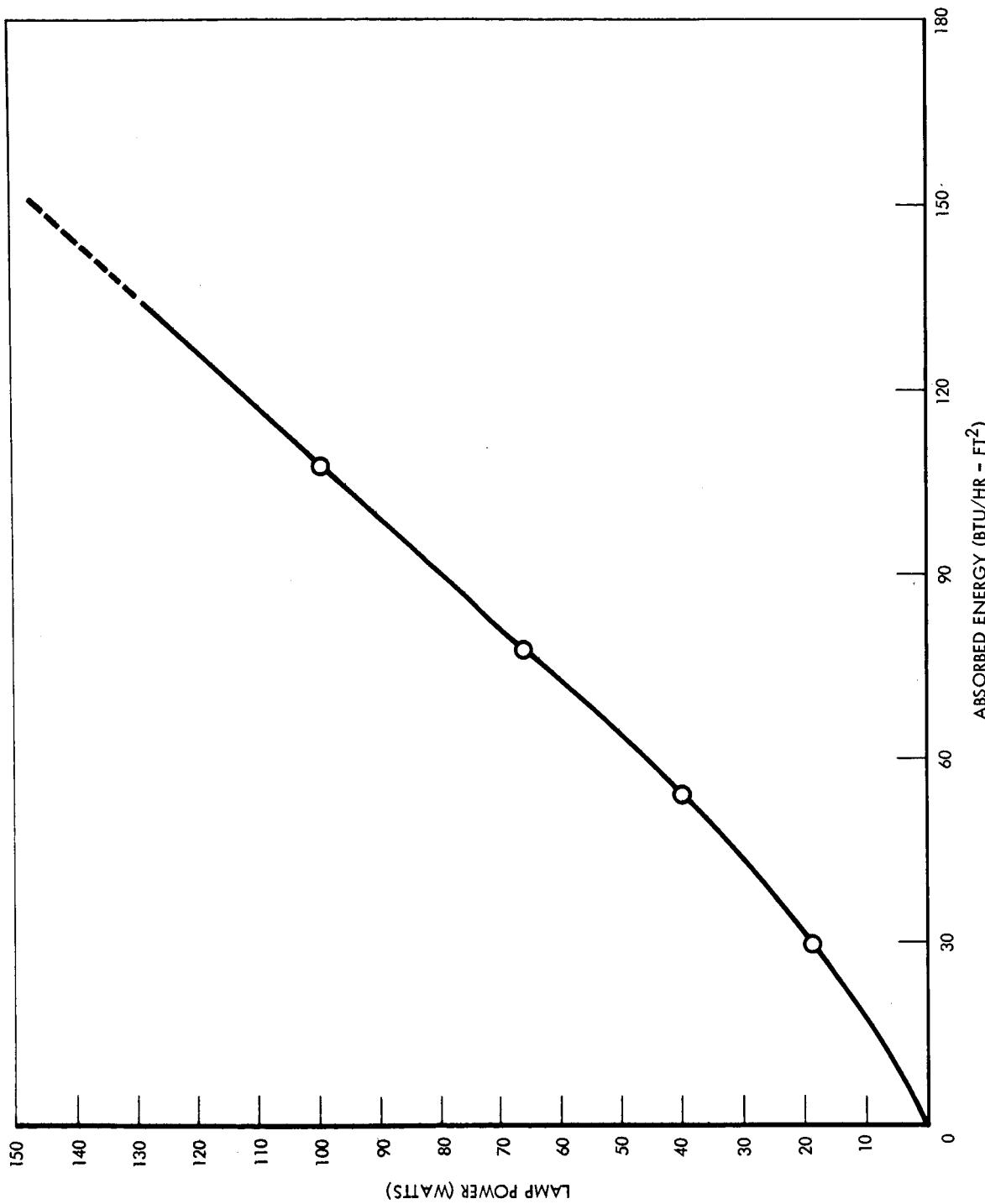


Figure 15. Calibration Curves for the Infrared Lamp Array External Heat Input—Radiator Panels

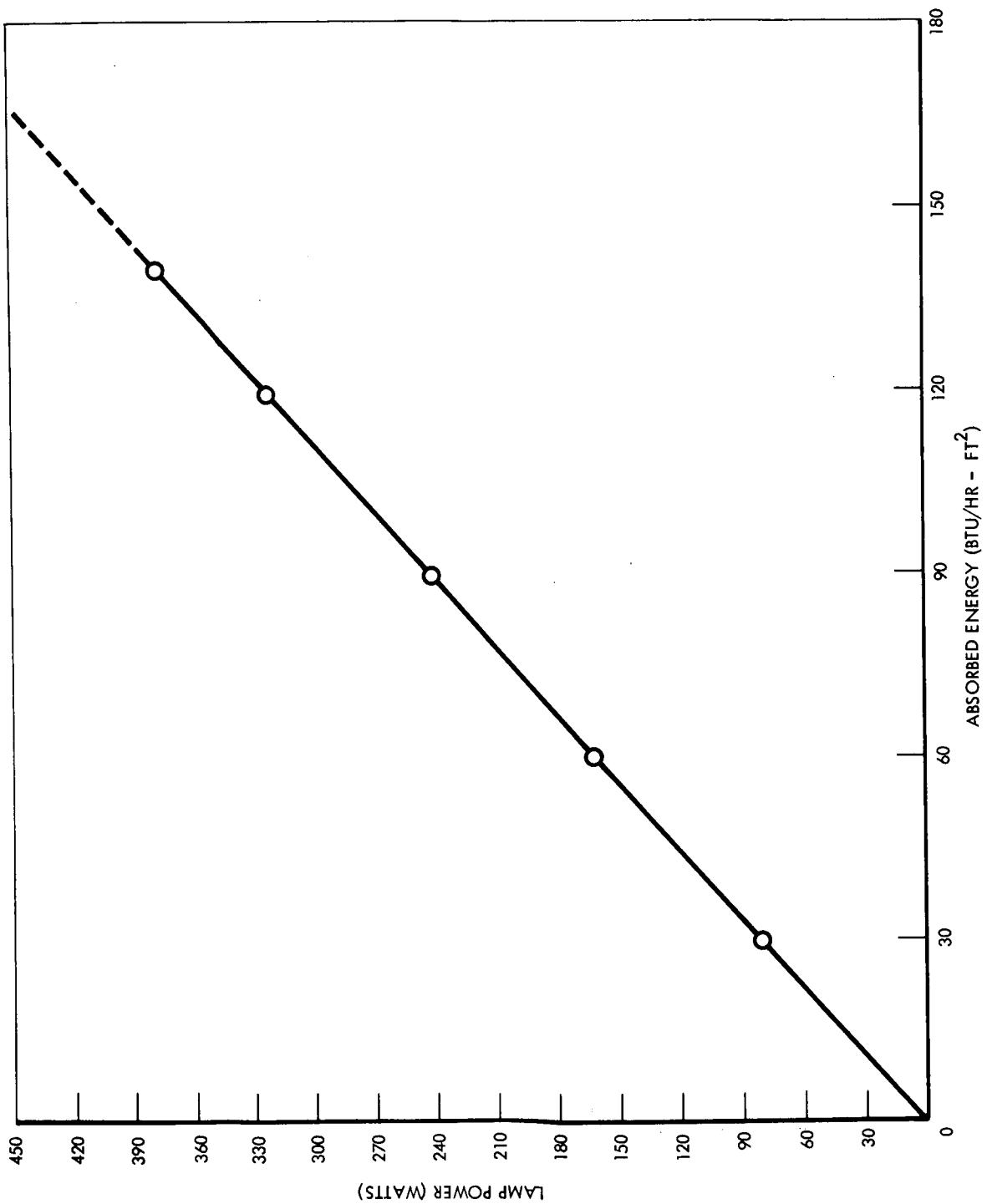


Figure 16. Calibration Curves for the Infrared Lamp Array External Heat Input—Radiator Edges

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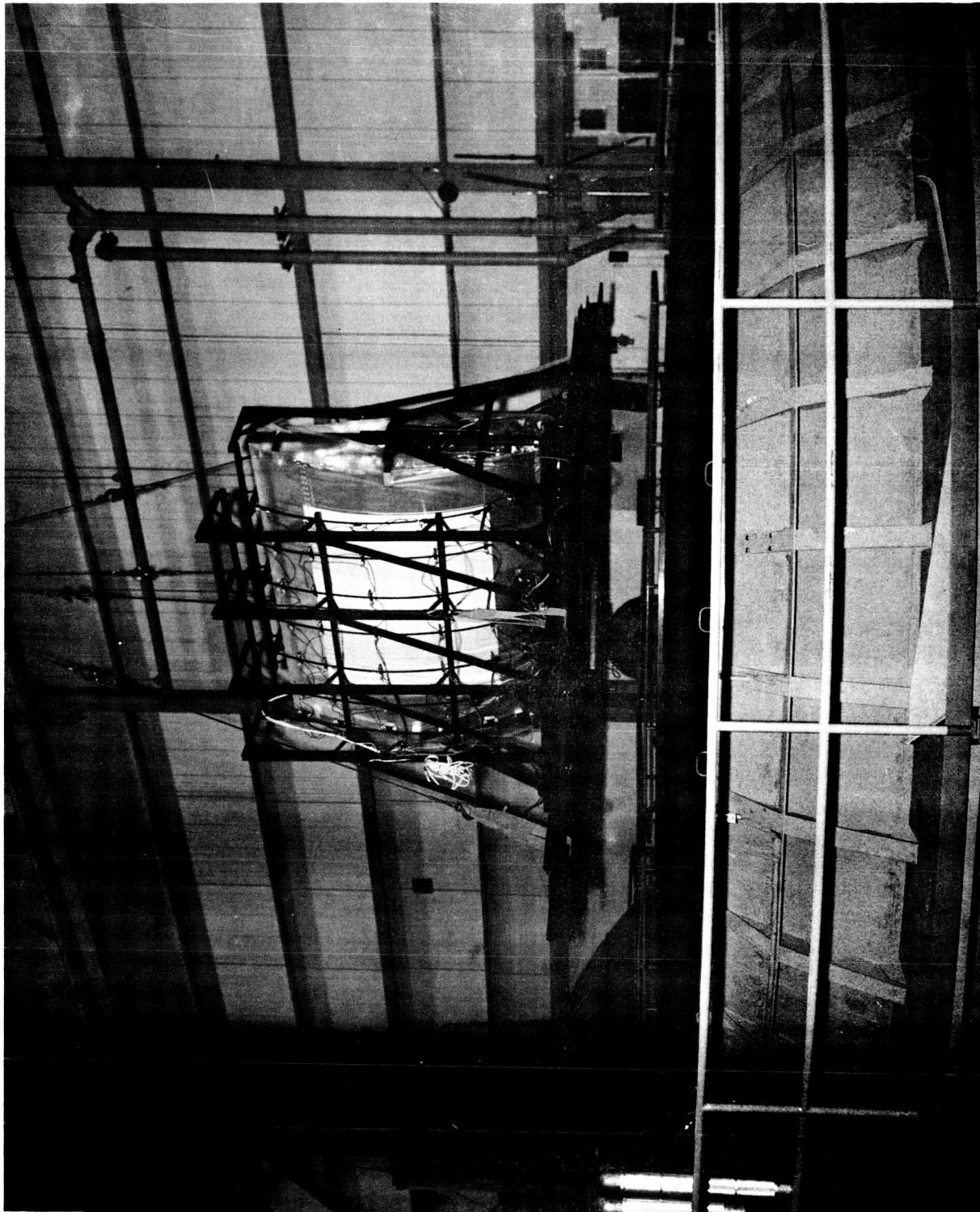


Figure 17. Test Specimen Assembly Being Lowered into Vacuum Chamber

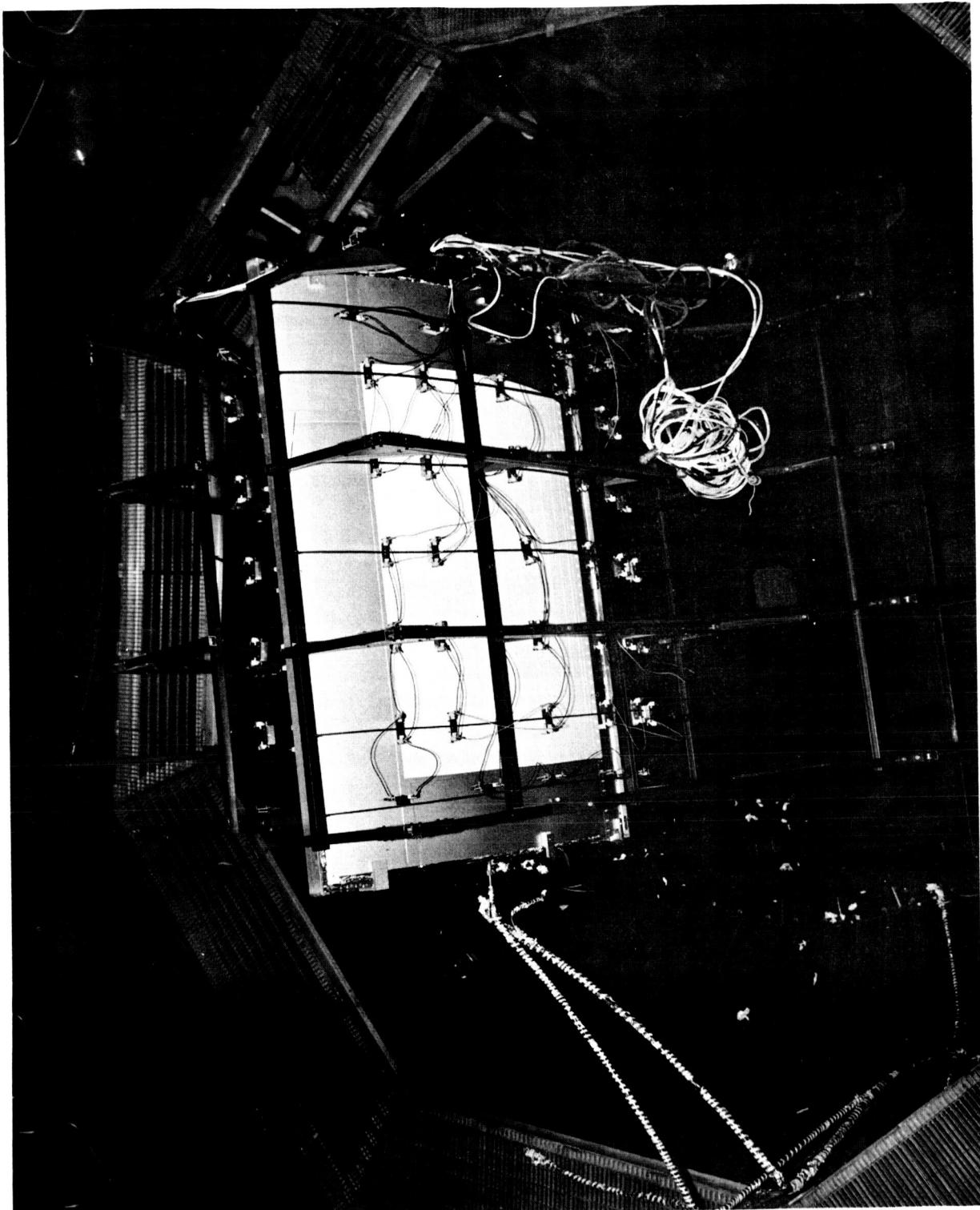


Figure 18. Test Specimen Assembly Installed in Vacuum Chamber



Figure 19. Radiator A With High Radiator External Heat Input and Low Edge  
External Heat Input



Figure 20. Radiator B With Low Radiator External Heat Input and High Edge External Heat Input



Table 2. Summary of Test Conditions

Test Run	External Heat Input (Btu/Hr-Ft <sup>2</sup> )				Nominal Fluid Inlet Temperature(F)	Flow Rate Pounds/Hour	Run Time (Minutes)	Isolation Valve O = Open; C = Closed				Simulation			
	Radiators		Radiator Edges					AI	AE	BI	BE				
	A	B	A	B											
1	136	126	135	63	95	240	180	O	O	O	O	Steady state hot			
2	136	126	135	63	105	200	200	O	O	O	O	Steady state hot			
3	36	36	23	23	75	200	240	O	O	O	O	Steady state cold			
4	36	36	23	23	75-105*	200	220	O	O	O	O	Recovery transit			
5	Figure 24		Figure 25		95	240	195	O	O	O	O	X-Axis tangent earth			
6	Figure 21		Figure 21 and Table 4		95	200	180	O	O	O	O	X-Axis to sun			
7	Figure 21		Figure 21 and Table 4		75	200	180	O	O	O	O	X-Axis to sun			
8	Figure 22		Figure 23 and Table 4		Cycle 75-85*	200	540	O	O	O	O	Predicted drift			
9	22	22	15	15	70	200	120	O	O	O	O	Steady state cold			
10	22	22	15	15	70-100*	200	180	O	O	O	O	Intermittent			
11	22	22	15	15	95	200	60	O	O	O	O	Intermittent			
12	22	22	15	15	95	200	20	C	O	C	O	Intermittent			
13	22	22	15	15	95	200	20	O	C	O	C	Intermittent			
14	22	22	15	15	95	200	60	O	O	O	O	Intermittent			
19	22	22	15	15	95	200	30	O	O	O	O	Intermittent			
20	22	22	15	15	95	200	20	O	O	C	O	Intermittent			
21	22	22	15	15	95	200	20	O	O	O	C	Intermittent			
22	22	22	15	15	95	200	60	O	O	O	O	Intermittent			
23	22	22	15	15	95	200	30	O	O	O	O	Intermittent			
26	22	22	15	15	-	-	10	C	C	C	C	Intermittent			
27	22	22	15	15	95	200	60	O	O	O	O	Intermittent			
28	22	22	15	15	-	-	30	C	C	C	C	Intermittent			
29	22	22	15	15	95	200	90	O	O	O	O	Intermittent			
32	26	26	15	15	75	200	60	O	O	O	O	Intermittent			
33	26	26	15	15	75	200	20	C	O	C	O	Intermittent			
34	26	26	15	15	75	200	20	O	C	O	C	Intermittent			
35	26	26	15	15	75	200	60	O	O	O	O	Intermittent			
40	26	26	23	23	75	200	30	O	O	O	O	Intermittent			
41	26	26	23	23	75	200	20	O	O	C	O	Intermittent			
42	26	26	23	23	75	200	20	O	O	O	C	Intermittent			
43	26	26	23	23	75	200	60	O	O	O	O	Intermittent			
44	26	26	23	23	75	200	30	O	O	O	O	Intermittent			
45	26	26	23	23	-	-	10	C	C	C	C	Intermittent			
46	26	26	23	23	75	200	200	O	O	O	O	Intermittent			
47	26	26	23	23	-	-	30	C	C	C	C	Intermittent			
48	26	26	23	23	75	200	90	O	O	O	O	Intermittent			
49	26	26	23	23	75	200	30	C	O	C	O	Forced recovery			
50	26	26	23	23	75	200	-	O	C	C	C	Differential pressure measurement for individual flow circuits			
51	26	26	23	23	75	200	-	C	C	O	C				
52	26	26	23	23	75	200	-	C	O	C	C				
53	26	26	23	23	75	200	-	C	C	C	O				
54 (1A)	Table 5		Table 5		64	200	480	O	O	O	O	RT random drift - orbit			
55 (1B)	Table 5		Table 5		64-70*	200	20	O	O	O	O	RT random drift - transition			
56 (1C)	Table 5		Table 5		70	200	180	O	O	O	O	RT random drift - orbit			
57 (1D)	Table 5		Table 5		82	200	120	O	O	O	O	RT random drift - orbit			
58 (2A)	Table 5		Table 5		64	200	360	O	O	O	O	X-Axis to sun - orbit			
59 (2C)	Table 5		Table 5		70	200	360	O	O	O	O	X-Axis to sun - orbit			
60 (3A)	Figure 26		Figure 27		64	200	90	O	O	O	O	X-Axis tangent earth - orbit			
61 (3A)	Figure 26	19	Figure 27	2	64	200	150	O	O	O	O	X-Axis tangent earth - no roll-freeze			
62 (3B)	Figure 26		Figure 27		80	200	480	O	O	O	O	X-Axis tangent earth - orbit			

\*Rate of temperature change is approximately one-third of degree per minute.



Table 3. External Heat Inputs by Manual Control to Zones  
9N, 10N, 9S, and 10S—Test Run 8

	Time (min.)	Radiator Edge A	Radiator Edge B		Time (min.)	Radiator Edge A	Time (min.)	Radiator Edge B	
Run 6	0	10	10	Run 8 (Cont)	165	13	165	67	
	45	19	19		175	25	175	37	
	55	31	31		185	41	185	103	
	75	19	19		195	61	195	13	
	85	10	10		205	133	235	9	
	135	19	19		215	7	245	6	
	145	31	31		235	12	255	9	
	165	19	19		245	15	265	20	
	175	10	10		255	34	270	59	
	180	Complete			265	53	275	28	
Run 7	0	10	10		275	107	280	53	
	45	19	19		280	32	290	10	
	55	31	31		285	39	300	5	
	75	19	19		295	37	310	0	
	85	10	10		305	13	340	23	
	135	19	19		315	25	350	17	
	145	31	31		325	24	360	43	
	165	19	19		335	20	370	56	
	175	10	10		345	52	380	25	
	180	Complete			355	43	390	18	
Run 8	Time (min.)	Radiator Edge A	Time (min.)	Radiator Edge B		365	61	400	14
	0	32	0	28		375	12	410	12
	5	38	5	53		385	101	420	9
	15	37	15	10		390	6	430	24
	25	13	25	5		415	13	440	67
	35	25	35	0		420	7	450	37
	45	24	65	23		430	13	460	103
	55	20	75	17		440	25	470	13
	65	52	85	43		450	41	500	9
	75	43	95	56		460	61	510	6
	85	61	105	25		470	133	520	9
	95	12	115	18		480	7	530	20
	105	101	125	14		500	12	535	59
	115	6	135	12		510	15	540	Complete
	145	13	145	9		520	34		
	155	7	155	24		530	53		
						540	107		
						545	Complete		

Table 4. External Heat Inputs for Supplemental Test Runs 54 Through 62

Data Trak Control					Manual Control		
Time (Min.)	Radiator A	Radiator B	Radiator Edge A	Radiator Edge B	Time (Min.)	Radiator Edge A (Zones 9 and 10)	Radiator Edge B (Zones 9 and 10)
0	0	109	24	140	0	24	148
8	43	73	19	72	8	17	67
16	53	36	138	9	16	177	8.5
24	126	33	44	6	23	8	8
32	31	33	8	6	32	8	8
60	31	33	8	6	40	8	8
68	93	36	110	19	47	8	8
76	113	39	137	46	56	8	8
84	43	58	33	138	63	111	12
96	80	45	37	112	71	143	20
100	35	67	9	54	80	28	48
108	107	58	137	10	88	24	130
116	31	36	11	8	95	18	119
120	33	31	8	8	104	140	9
136	33	31	8	8	112	8	8
144	33	31	48	8	119	8	8
152	55	36	137	13	128	8	8
162	123	45	45	19	136	8	8
168	59	82	34	26	143	8	8
176	45	116	26	8	152	48	14
182	43	36	19	46	160	168	18
190	81	31	82	140	167	46	29
196	31	31	8	74	176	25	100
222	31	31	8	70	184	19	153
232	31	31	8	70	191	82	10
240	55	59	11	52	200	8	8
248	123	39	137		208	8	8
256	73	45	111	19	215	8	8
264	45	73	24	24	224	8	8
272	38	120	21	74	232	8	8
280	47	47	40	137	239	11	51
286	36	33	8	37	248	169	18
290	36	33	8	6	256	81	24
328	36	33	8	6	263	25	73
336	113	39	9	115	272	20	165
344	95	43	137	17	280	41	26
348	65	50	121	20	287	8	8
350	50	55	30	39	296	8	8
358	39	116	22	15	304	8	8
366	36	33	9	77	311	8	8
376	36	33	137	6	320	8	8
408	36	33	8	6	328	8	113
416	88	116	8	140	335	13	18
424	73	38	101	15	344	11	24
440	43	45	137	22	352	30	42
448	36	102	48	26	359	19	13
456	109	108	13	127	368	11	80
464	38	36	137	136	376	173	8
472	58	36	9	8	383	8	8
480	23	92	13	2	392	8	8
					400	8	8
					407	8	8
					416	8	162
					422	101	17
					431	141	23
					440	50	26
					448	22	127
					455	14	137
					464	141	8
					472	8	8
					479	16	1

This completes Run 54. Recycle to time zero to begin Run 55, continuing for Runs 56 and 57.

This completes Run 54. Recycle to time zero to begin Run 55, continuing for Runs 56 and 57.



Table 4. External Heat Inputs for Supplemental Test Runs 54 Through 62 (Cont)

Data Trak Control					Manual Control		
Time (hrs.)	Radiator A	Radiator B	Radiator Edge A	Radiator Edge B	Time (min.)	Radiator Edge A (Zones 9 and 10)	Radiator Edge B (Zones 9 and 10)
0	58	17	15.0	5.0	0	14.0	10
0.05	22	70	13.0	17.0	6	9.0	3
0.10	45	17	12.0	2.0	12	8.0	6
0.15	29	26	6.0	5.5	18	5.0	10
0.20	18	41	2.5	11.0	24	9.0	6
0.25	45	17	11.0	2.0	30	9.0	5
0.30	22	39	5.0	9.0	36	0.4	11
0.35	22	39	5.0	9.0	42	7.0	20
0.40	58	7	14.0	0	48	34.0	21
0.45	18	45	5.0	10.0	54	30.0	16
0.50	25	34	5.0	9.0	60	21.0	27
0.55	58	7	15.0	0.5	66	22.0	36
0.60	0.5	70	0.5	22.0	72	35.0	23
0.65	52	14	2.5	4.5	78	20.0	18
0.70	31	34	13.0	11.0	84	14.0	10
0.75	10	65	2.5	30.0	90	6.0	25
0.80	95	7	63.0	0.2	96	10.0	5
0.85	10	71	5.0	42.0	102	7.0	7
0.90	39	43	15.0	25.0	108	5.0	9
0.95	73	21	40.5	7.5	114	8.0	6
1.00	18	70	5.0	39.0	120	10.0	5
1.05	58	32	37.0	15.0	126	10.0	10
1.10	60	39	31.0	35.0	132	16.0	24
1.15	18	70	13.0	37.0	138	22.0	16
1.20	67	26	50.0	19.0	144	33.0	8
1.25	13	45	21.0	37.0	150	27.0	40
1.30	73	70	7.5	30.0	156	14.0	26
1.35	39	7	31.0	5.5	162	25.0	11
1.40	31	26	15.0	10.0	168	33.0	27
1.45	53	32	11.0	10.0	174	12.0	13
1.50	1	39	13.0	31.0	180	14.0	5
1.55	50	61	0.1	15.0	Repeat		
1.60	27	11	13.0	2.0			
1.65	18	26	5.5	5.5			
1.70	50	45	2.0	11.0			
1.75	31	17	13.0	0.5			
1.80	18	32	5.5	7.5			
1.85	50	45	5.0	12.0			
1.90	18	14	12.0	3.0			
1.95	27	45	5.1	11.0			
2.00	58	32	5.5	6.5			
2.05	0	7	15.0	0.5			
2.10	58	71	0	22.0			
2.15	50	11	20.5	2.0			
2.20	18	26	31.0	5.5			
2.25	95	73	0.5	42.0			
2.30	18	5	39.0	0.0			
2.35	41	61	5.0	31.0			
2.40	70	45	30.0	17.5			
2.45	22	21	37.0	5.5			
2.50	58	76	7.5	61.0			
2.55	55	39	44.5	17.5			
2.60	13	29	30.0	12.0			
2.65	58	71	5.0	40.0			
2.70	45	25	30.0	13.0			
2.75	36	39	20.0	22.0			
2.80	73	70	34.0	31.0			
2.85	10	21	30.0	16.5			
2.90	36	61	0.5	30.0			
2.95	50	57	20.0	7.0			
3.00	50	64	15.0	5.0			
Repeat							



Table 4. External Heat Inputs for Supplemental Test Runs 54 Through 62 (Cont)

Runs 60 and 61				Run 62							
Time (min.)	Radiator Edge A	Time (min.)	Radiator Edge B	Time (min.)	Radiator Edge A	Time (min.)	Radiator Edge B	Time (min.)	Radiator Edge A	Time (min.)	Radiator Edge B
0	50	0	103	5	24	5	51	285	12	296	99
5	41	5	80	9	16	9	104	293	11	304	48
15	23	15	14	17	10	17	126	308	22	312	12
25	15	25	0	49	11	25	5	316	28	320	8
65	44	70	89	64	109	35	4	324	26	328	5
75	50	80	103	72	65	60	5	332	57	336	6
85	41	90	80	80	37	68	40	340	105	344	8
End Run 60; Start Run 61				95	30	76	97	348	122	359	123
95	23	100	14	103	17	84	120	356	8	367	109
105	15	110	0	111	15	92	95	364	7	375	61
145	44	155	89	119	17	100	0	372	6	383	30
155	50	165	103	144	57	130	35	392	10	391	27
160	50		103	152	39	138	92	402	45	398	18
Recycle				160	50	146	115	410	101	406	12
				168	48	154	92	418	122	414	13
				176	37	162	35	426	96	422	14
				184	23	170	0	430	96	426	14
				192	14	200	37	470	44	471	89
				207	17	208	94	480	50	481	103
				222	20	216	126	490	41	491	80
				230	36	224	95				
				238	44	232	37				
				246	42	240	1				
				254	33	260	2				
				262	57	280	96				
				270	13	288	123				

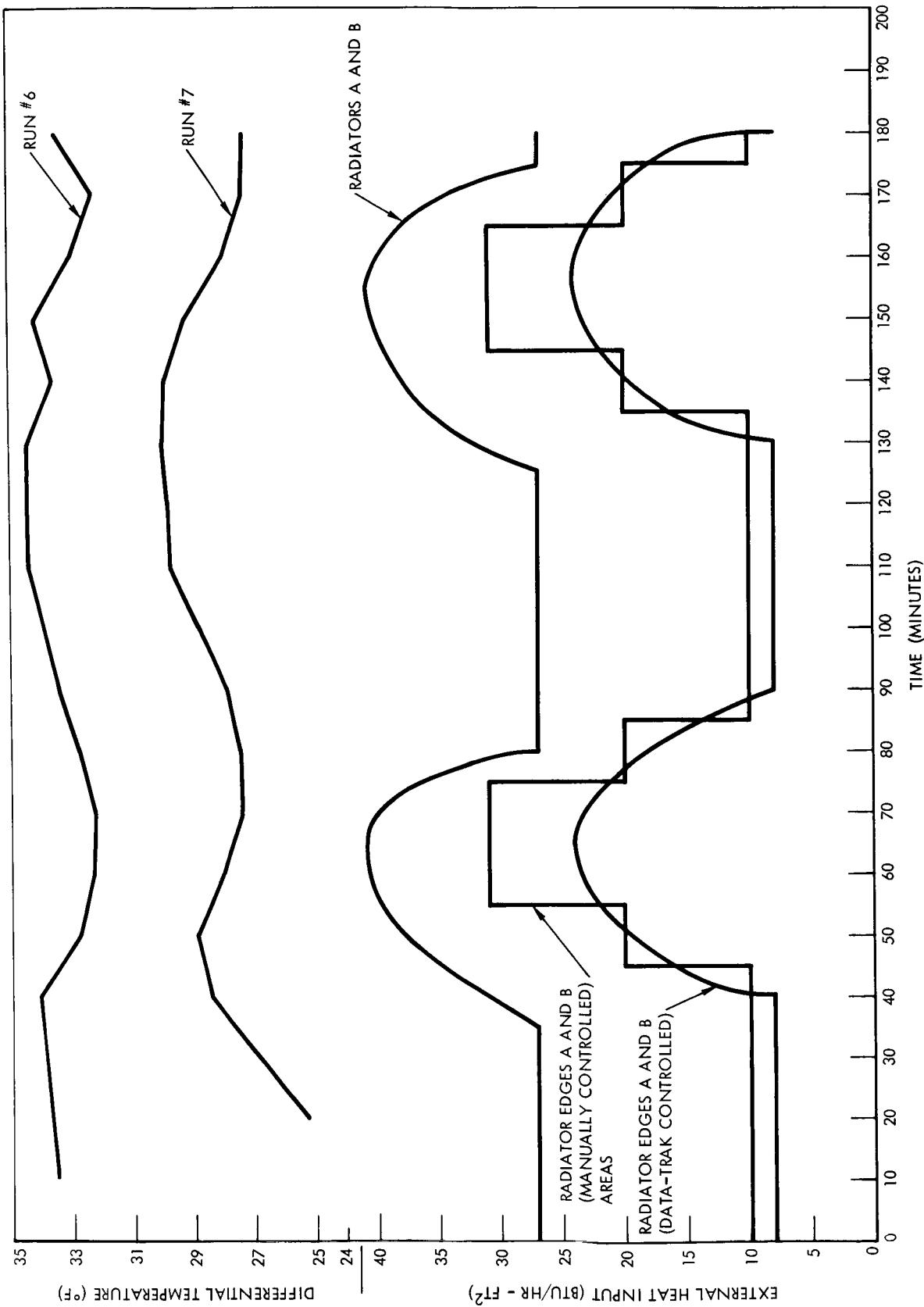


Figure 21. External Heat Input and Differential Temperature for Radiator Edges—Test Runs 6 and 7

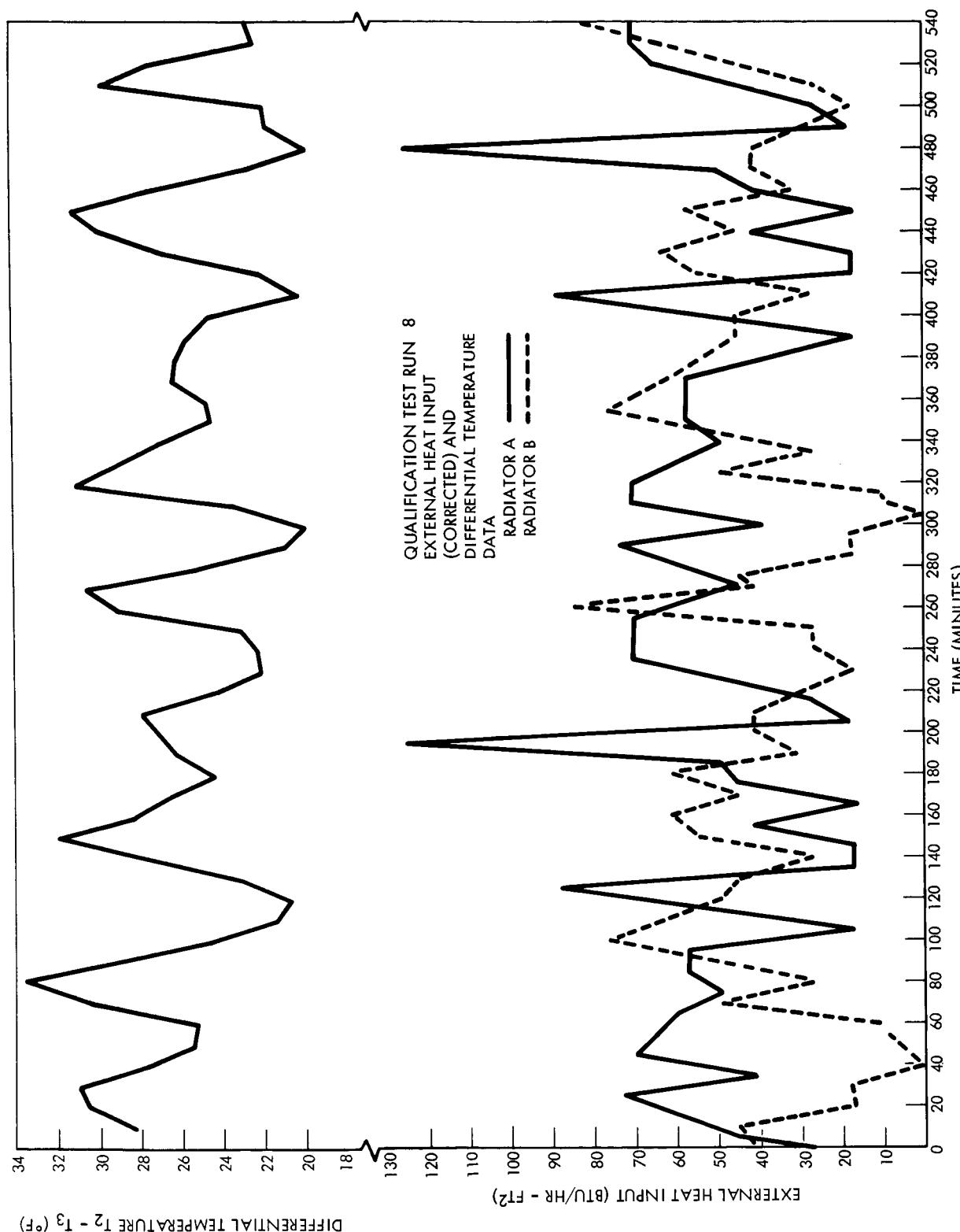


Figure 22. External Heat Input and Differential Temperature for the Radiators—Test Run 8

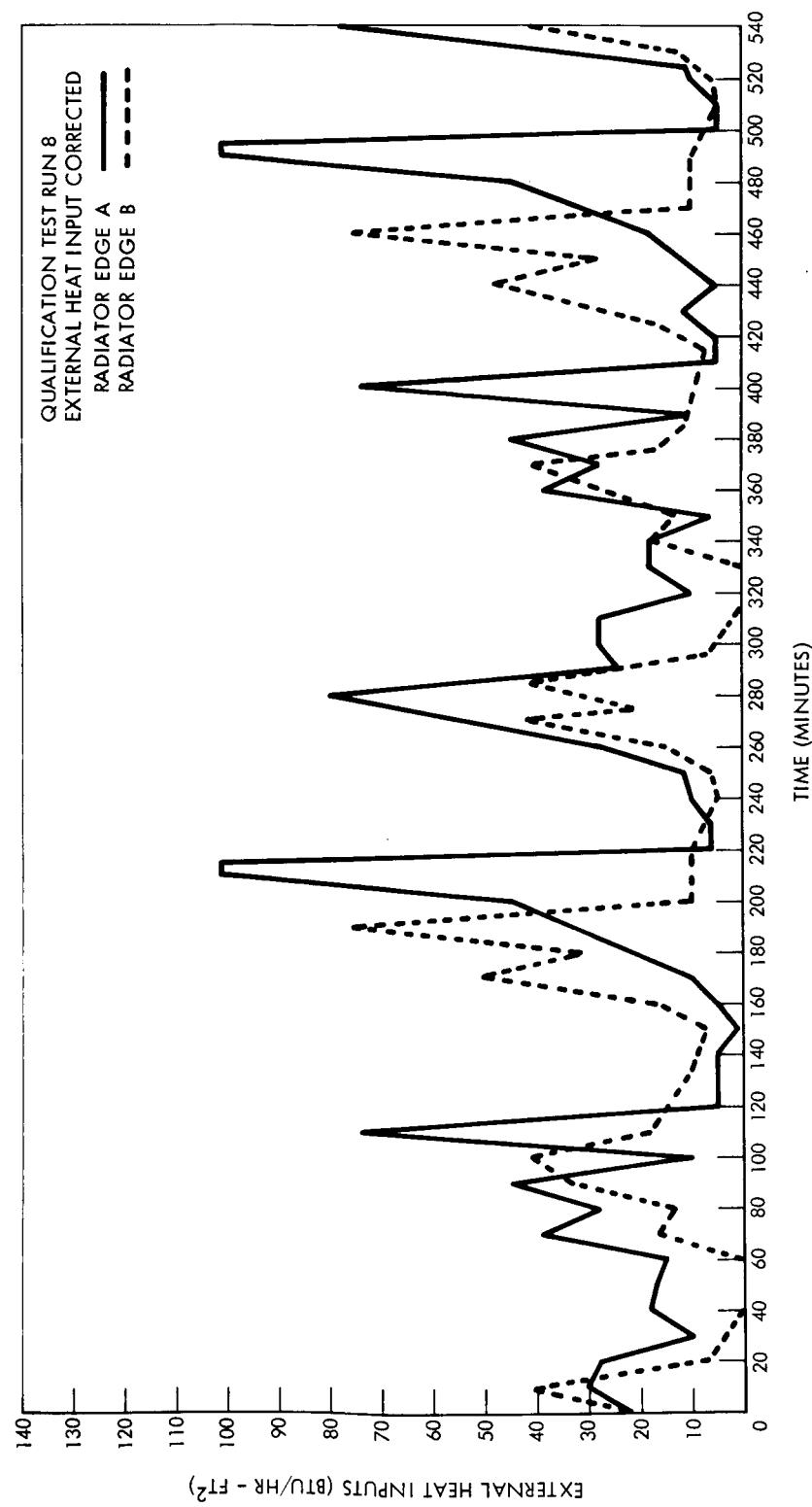


FIG. 23

Figure 23. External Heat Input for the Radiator Edges—Test Run 8

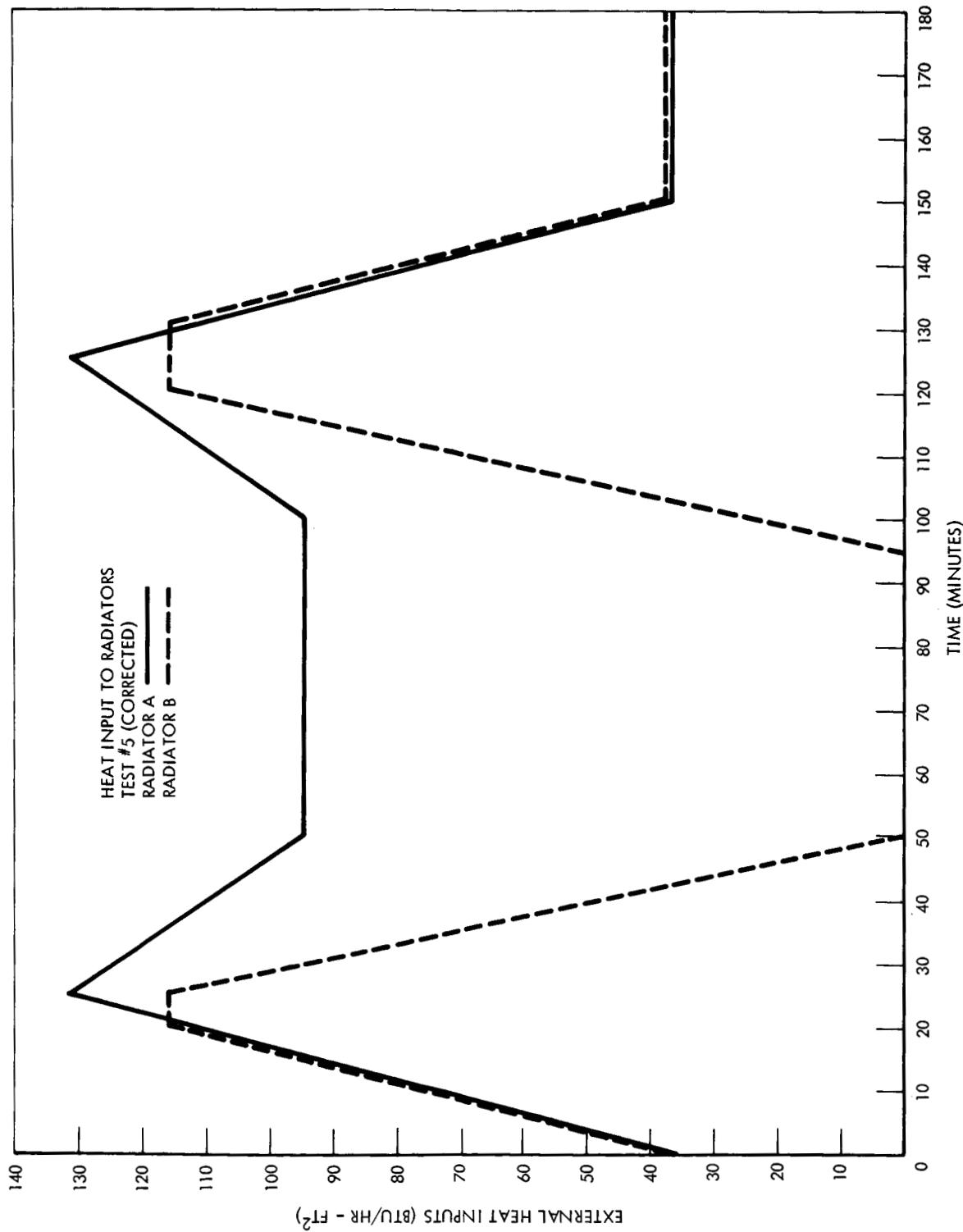


Figure 24. External Heat Input for the Radiators—Test Run 5

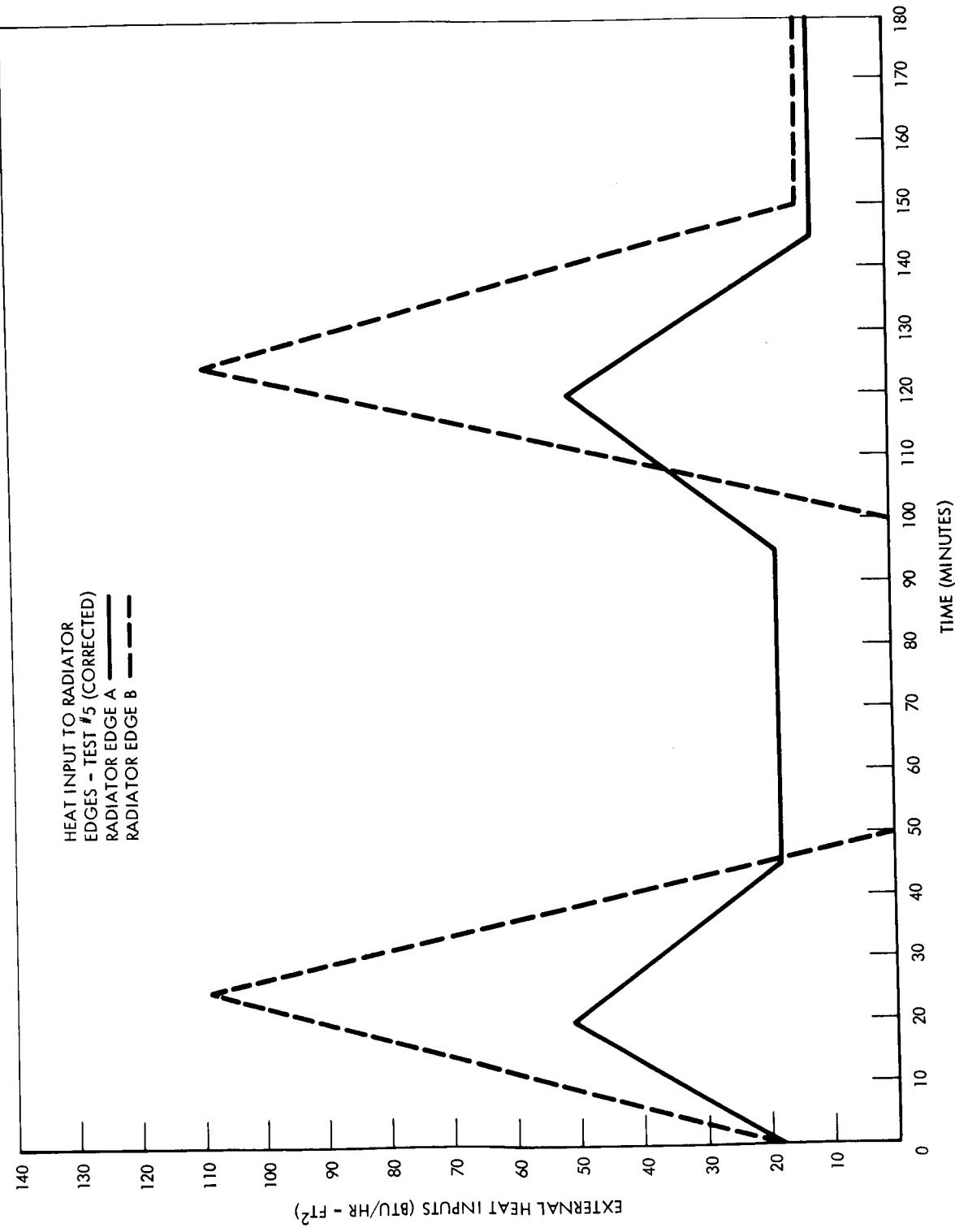


Figure 25. External Heat Input for the Radiator Edges—Test Run 5

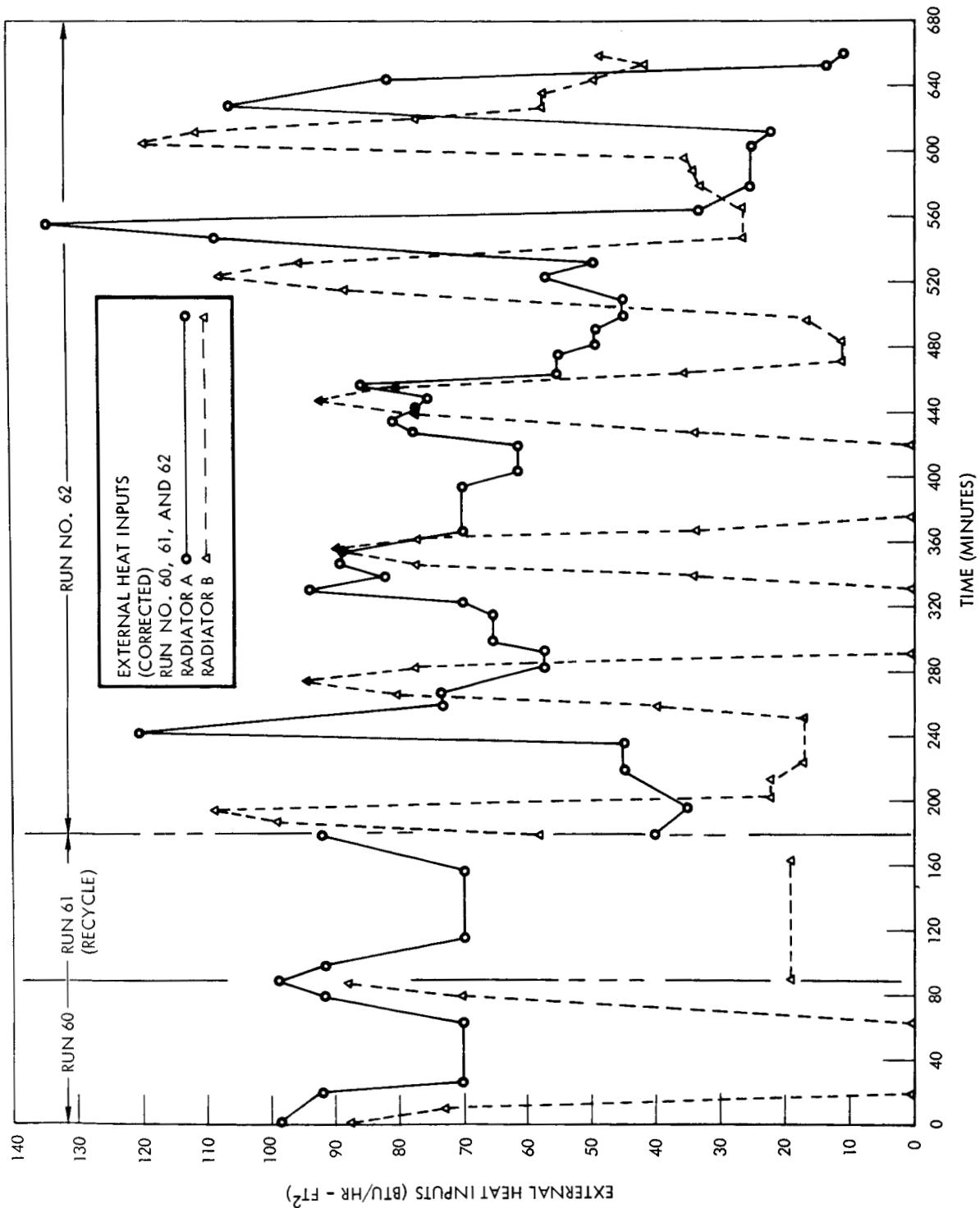


Figure 26. External Heat Input for the Radiators—Test Runs 60, 61, and 62

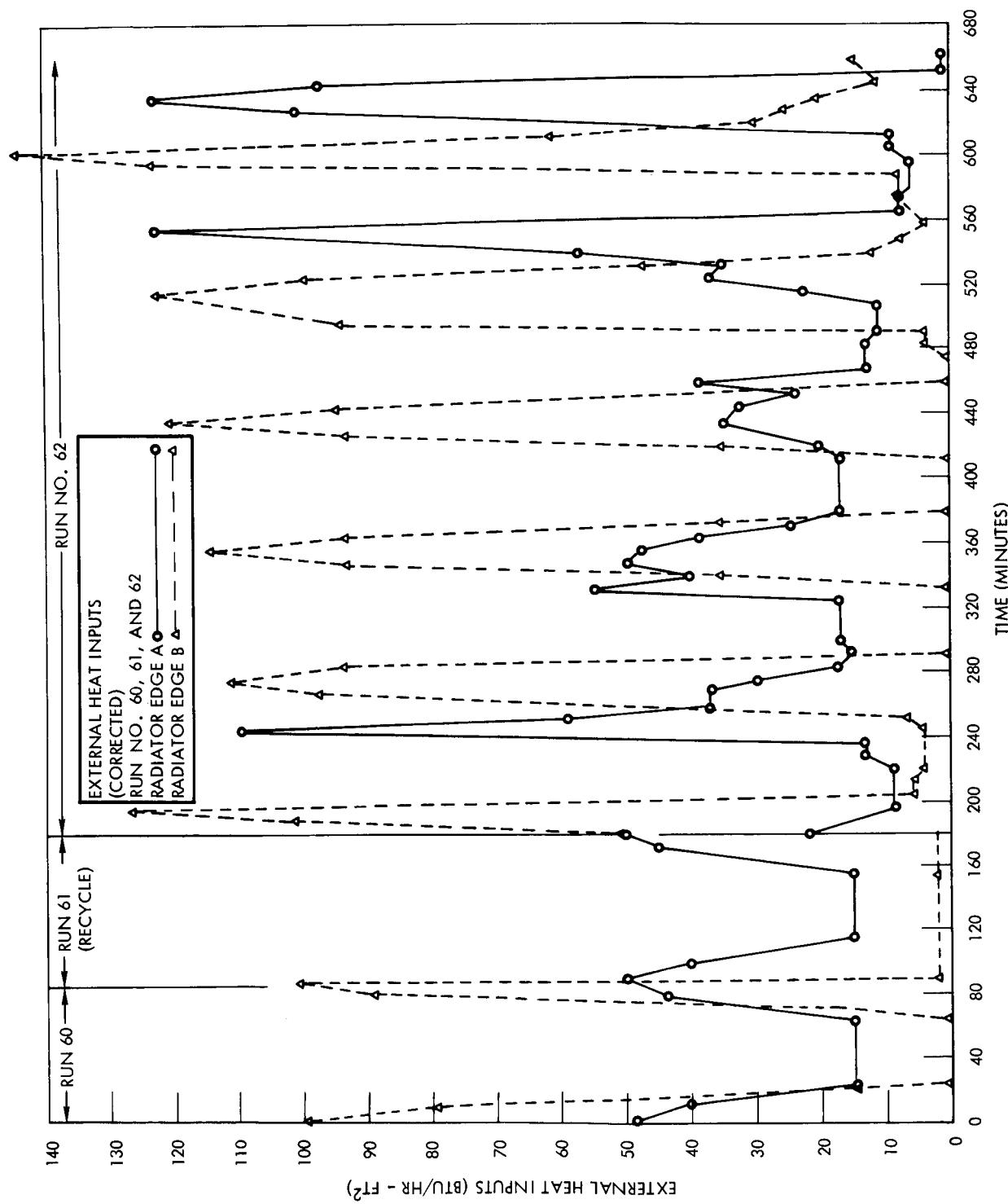


Figure 27. External Heat Input for the Radiator Edges—Test Runs 60, 61, and 62



was set to obtain the specified external heat input absorbed by the radiators. Absorption data were 136 Btu/hr-ft<sup>2</sup> for Radiator A, 126 Btu/hr-ft<sup>2</sup> for Radiator B, 135 Btu/hr-ft<sup>2</sup> for radiator edge A, and 63 Btu/hr-ft<sup>2</sup> for radiator edge B. For this test, and all tests through Test Run 11, all four radiator isolation valves were maintained in the open position. The data outputs from the test instrumentation were scanned by the digital acquisition system approximately every ten minutes, while the analog recorder plotted much of this data output at a rate of one point per second (the handlogged data readouts were recorded when a scan was made by the digital acquisition system). This was continued until the radiator system reached a stabilized temperature condition (defined as that time when certain critical temperature indications changed less than 4.0 F per hour), and this was considered the end of Test Run 1.

For Test Run 2 the water-glycol inlet-flow rate and temperature and the infrared array external heat input were readjusted to obtain the values shown in Table 2. When the radiator system again reached a stabilized temperature condition, the test run was completed. In a similar manner, Test Runs 3 and 4 were completed except that in Test Run 4 the water-glycol inlet temperature to the radiators was increased linearly from 75 to 105 F during the first 90 minutes of test time. Test Runs 5, 6, 7, and 8 provided for the varying external heat inputs to the radiators expected in an earth orbit environment and are therefore nonstabilized temperature tests. As specified in Table 1, the external heat inputs for these tests were varied according to a specified curve, and the tests were considered complete after a specified length of time. Test Runs 9 and 10 were stabilized temperature tests with relatively low external heat inputs, except that in Test Run 10 the water-glycol inlet temperature to the radiators was increased linearly from 70 to 100 F during the first 90 minutes of test time.

Test Runs 11 through 29 were considered intermittent tests in that they followed a specified sequence of closing and opening certain radiator isolation valves and were conducted for a relatively short predetermined length of time. During each of these test runs the external heat inputs, the water-glycol inlet temperatures, and the water-glycol flow rates were maintained at the constant values shown in Table 2. Test Runs 30 through 48 were made at the same conditions as Test Runs 11 through 29 except that the water-glycol inlet temperature was maintained at 75 F instead of 95 F. Test Run 49 was a special test that was conducted to force the recovery of certain radiator flow passages. (At that time these passages contained very cold and highly viscous water-glycol which prevented normal flow.) This recovery process was accomplished by closing the radiator isolation valves of the nonstagnated flow passages thereby forcing comparatively warmer water-glycol through the stagnated passages. Test Runs 50 through 53 were made in order to



determine the differential pressure across each of the four radiator flow paths (A-I, B-I, A-E, and B-E). This was accomplished for each individual test run by closing all the radiator valves except one so as to permit fluid circulation and the differential pressure measurement ( $P_2 - P_3$ ) for only that one flow path controlled by the open valve. Test Runs 54 through 62 were the supplemental tests, and as shown in Table 2, they were nonstabilized temperature tests conducted for a predetermined length of time. All the supplemental tests featured a varying external heat input and, in addition, Test Runs 55 and 57 were conducted with a varying water-glycol inlet temperature.

All 50 test runs were accomplished consecutively so that the final conditions for any test run became the starting conditions for the next test run. In addition, the tests were made in numerical order except for the three official qualification Test Runs 6, 7, and 8. In order to allow for the additional time that was required to refine the external heat input calibration curves, Test Runs 6, 7, and 8 were made in the interval between Test Runs 57 and 58.



## IV. TEST RESULTS

Table 5 presents the complete results of all test runs. In addition, for Test Runs 6, 7, and 8, the official qualification test runs, Figures 26 and 27 graphically show the temperature differential ( $T_2 - T_3$ ) across the radiator system as it relates to the varying external heat input, and as a function of the test-run elapsed time. Since the water-glycol flow rate through the radiators was essentially constant during each of these test runs, the plotted temperature differential was indicative of the radiator's heat rejection capacity. In accordance with NAA Specification MA0411-0005 for Test Runs 6, 7, and 8, the required minimum average heat rejection was 4680 Btu/hr, 3050 Btu/hr, and 3480 Btu/hr, respectively. From the results shown in Figures 26 and 27 (and with a water-glycol flow rate of 200 lbs/hr and water-glycol specific heat values between 0.722 and 0.730), the actual average heat rejection was 4950 Btu/hr, 4190 Btu/hr, and 3715 Btu/hr for Test Runs 6, 7, and 8, respectively. Therefore, the radiator test system satisfactorily met its thermal performance qualification requirements.

Test 1 completed  
Spec. Met.  
T.L. Under test ~1-



## V. DISCUSSION

During all test runs the flow rate measured by turbine flowmeter  $W_2$  should have equaled the sum of the flow rates measured by turbine flowmeters  $W_5$  plus  $W_7$ . In addition, the flow rate measured by  $W_2$  should have been the same, within the tolerances of the accuracies of the instrumentation, as that measured by the visual flowmeter  $W_1$  for all test runs (except for Test Runs 9, and 58 through 61, when the  $T_4$  temperature dropped below 45 F, the temperature control valve was activated to bypass a portion of the  $W_1$  flow within the circulation unit.) As indicated in Table 3 test data, the  $W_5$  plus  $W_7$  total flow rate values agreed fairly well with the  $W_1$  flow rate values but consistently exceeded the  $W_2$  flow-rate values. A post-test recalibration of all flowmeters verified the existence of a  $W_2$  error, showing that either the  $W_2$  turbine flowmeter calibration had changed during the test runs or that the original calibration was incorrect. Figure 28 shows the original and post-test calibration curves. By using these curves the  $W_2$  test data can be corrected (this correction has not been made in this report since the redundancy of the flowmeter measurements allows for the presentation of all necessary data without the  $W_2$  values).

The original infrared lamp array (external heat input) calibrations were performed by using samples that contained three thermocouples, and that were irradiated with one energized infrared lamp. The resultant calibration curves were used in programming the external heat inputs for the first test runs. Results from these test runs indicated that an error probably existed in the calibration curves. An analysis of the calibration setup showed that the three thermocouples and the one infrared lamp were inadequate for an accurate calibration. Consequently, an additional series of calibrations was made using nine thermocouples and nine lamps as described in the test procedures. The test-run data obtained by using the original calibration curves have been corrected to reflect the heat inputs based on the more accurate calibration curves (Figures 15 and 16).

At the start of the test runs it was found that the 16-channel automatic power input programmer, because of electrical current limitations, could not supply the maximum required power to all 16 zones of the infrared-lamp array. In order to solve this problem, the electrical circuits for the infrared lamps irradiating the radiator edges were rewired so as to reduce the number of lamps per zone from five to four. The total number of infrared lamps used to irradiate the entire radiator test specimen was kept constant by adding four new zones, of three lamps each, identified as Zones 9 S and 10 S (radiator edge A) and Zones 9 N and 10 N (radiator edge B). These



additional zones were manually controlled through four variable transformers and monitored by a voltmeter and ammeter in each circuit.

For the test runs that required a variable external heat input (Test Runs 5, 6, 7, 8, and 54 through 62) it was not possible to manually vary the power to the four additional zones in order to produce exactly the same heat-input profile as that produced by the 16 automatically programmed zones. Therefore, for these variable external heat input test runs, both the manually controlled and the automatically programmed external heat-input profiles are presented (see Figure 21 and Tables 3 and 4). For all other test runs (constant external heat input) the controlled outputs of the automatic and manual zones were identical, and therefore the heat input profiles are presented without differentiations.

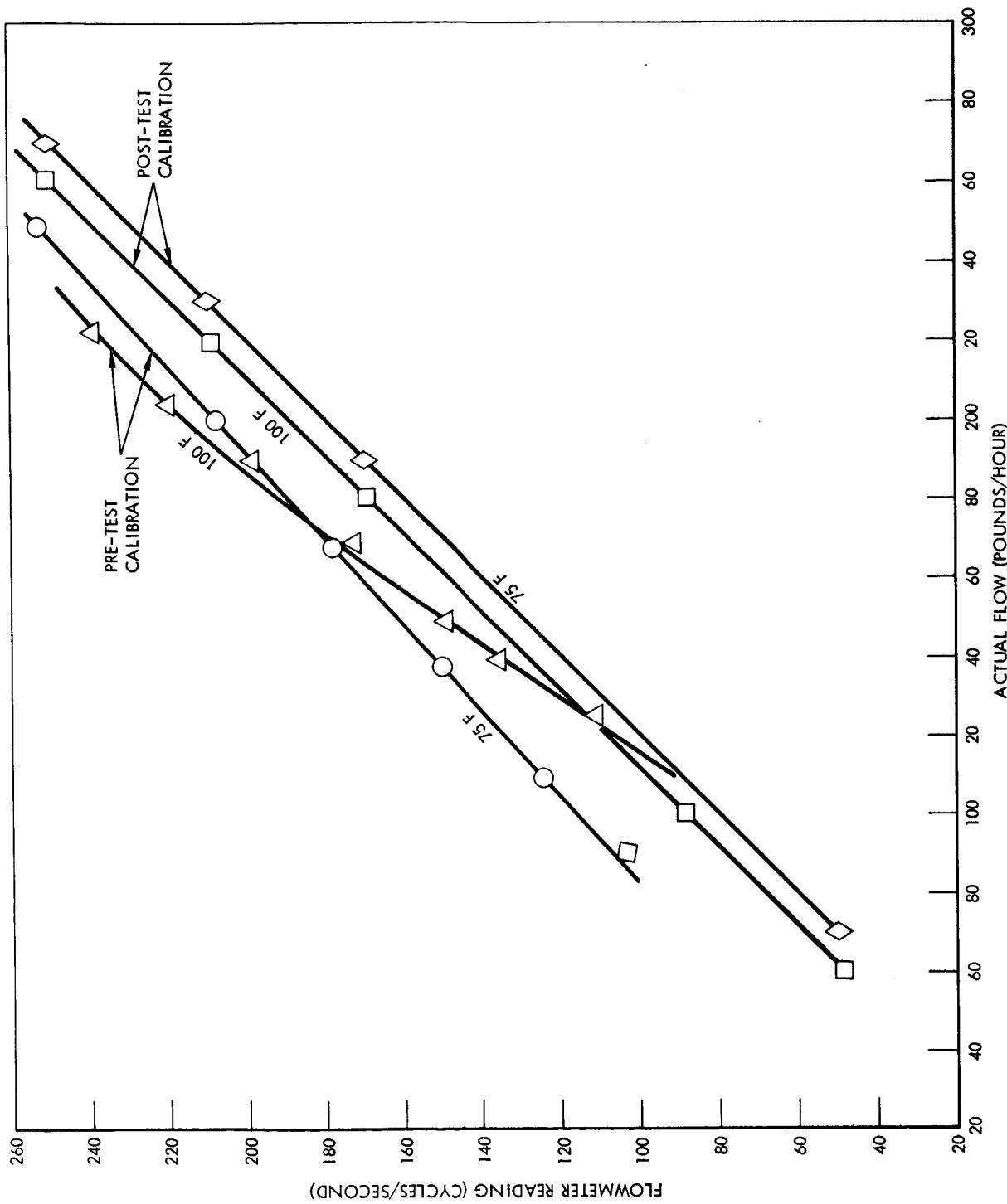


Figure 28. Calibration Curves for Turbine Meter W2

Table 5. Complete Test Data

## Test Data in Degrees F - Test Run 1

Thermocouple No.	Elapsed Time (Minutes)																
	11	20	30	40	50	60	70	80	90	100	113	120	130	140	152	160	170
1	96.5	97.6	98.1	96.8	97.3	97.0	97.6	98.2	97.0	98.0	97.3	96.2	96.8	97.3	97.0	96.8	97.3
2	95.3	95.4	95.5	94.1	94.6	94.8	96.1	96.4	95.1	97.2	96.8	95.2	95.7	96.1	95.0	96.2	96.2
3	85.6	87.6	88.8	87.9	89.1	89.1	89.5	89.8	90.3	88.2	91.7	90.5	90.7	90.8	87.7	92.1	90.0
3A	85.0	85.9	86.9	90.0	90.4	91.3	90.8	90.6	89.8	92.1	93.0	90.5	91.3	-	-	-	-
4	83.4	86.4	88.2	86.9	87.1	88.1	90.2	91.1	90.1	92.1	92.6	90.1	90.8	90.4	90.7	90.5	90.2
5	96.5	96.7	97.2	97.1	96.2	97.5	95.3	96.7	96.6	95.8	96.8	95.9	96.6	95.6	96.1	97.1	95.7
6	89.5	92.3	96.3	96.0	96.3	97.9	101.1	98.3	98.7	98.9	100.2	100.5	99.2	98.4	99.7	100.8	99.6
7	97.1	96.1	96.1	96.5	97.2	96.9	98.1	96.1	96.8	96.4	96.1	96.3	96.9	95.6	96.2	95.6	96.9
8 --	81.0	80.1	80.7	82.5	82.3	83.2	84.1	82.8	83.7	83.4	84.1	84.1	84.4	82.9	84.0	85.0	83.3
A1-10	95.7	95.6	96.1	97.4	97.3	97.8	98.3	97.5	97.6	96.9	97.5	97.9	98.3	97.1	97.9	97.7	97.5
A1-11	94.7	96.2	97.6	99.6	99.4	100.2	100.4	100.1	100.6	99.7	100.4	101.1	101.4	100.3	101.2	100.5	100.7
A1-12	95.1	96.9	98.4	100.6	100.7	101.6	101.6	101.5	102.3	101.0	101.6	102.5	102.8	101.8	102.9	101.9	102.3
A1-13	84.4	85.1	86.0	88.1	88.2	89.1	88.9	88.9	90.1	88.4	88.7	89.9	90.1	89.4	90.5	88.9	90.0
A1-28	97.3	98.7	99.8	101.6	101.5	102.1	101.8	101.5	102.3	101.0	101.1	102.1	102.3	101.8	102.6	101.1	102.1
A1-30	94.6	96.8	98.2	99.9	100.4	101.1	100.5	100.9	101.7	100.5	100.3	101.2	101.4	101.4	101.7	100.4	101.8
A1-31	88.1	90.6	92.0	93.2	94.0	94.4	93.9	94.9	95.6	94.4	94.1	94.9	95.1	95.5	95.5	94.4	95.8
A2-10	95.1	96.6	96.9	96.8	97.4	97.5	96.5	98.0	96.9	96.7	96.5	96.8	96.8	97.5	97.2	96.6	97.6
A2-11	94.7	99.5	102.7	104.9	106.8	108.2	108.4	110.0	109.7	109.6	109.6	109.9	110.1	110.6	110.2	110.9	110.9
A2-12	100.5	105.3	108.0	110.1	112.0	113.6	113.8	115.8	115.3	115.3	115.1	115.0	115.3	115.0	116.3	115.8	116.4
A2-13	89.2	90.1	91.1	92.6	93.2	93.9	94.4	94.5	94.7	94.3	94.6	95.0	95.4	-	94.6	95.2	95.6
A2-28	103.6	105.9	107.5	109.4	110.2	111.2	111.7	112.0	111.9	111.6	111.9	112.2	112.6	112.4	112.9	112.6	113.0
A2-30	98.8	101.9	104.1	106.5	107.6	108.9	109.4	109.8	109.6	109.9	110.3	110.6	110.4	110.8	110.4	110.8	110.8
A2-31	97.8	100.1	102.1	104.2	105.2	106.4	106.9	107.2	107.3	107.1	107.4	107.7	108.1	108.2	108.7	108.3	108.8
B1-9	89.5	89.6	89.8	90.3	90.5	90.8	90.5	90.6	90.2	90.0	89.9	90.4	90.5	90.4	90.6	89.9	90.5
B1-10	91.3	91.8	92.2	92.3	92.8	93.1	92.5	92.9	92.3	92.0	91.7	92.1	92.4	-	92.4	92.0	92.7
B1-11	82.2	83.5	84.2	85.1	85.4	85.9	85.7	86.5	86.6	86.3	86.1	86.3	86.3	86.2	86.4	86.4	86.5
B1-12	80.4	82.2	83.7	84.6	85.1	85.8	85.5	86.8	86.6	86.4	86.5	85.8	86.2	86.0	86.2	86.6	86.4
B1-13	77.9	78.2	78.3	78.9	79.0	79.3	79.2	79.7	79.9	79.5	79.5	79.1	79.4	79.1	79.3	79.4	79.4
B1-14	91.3	91.5	91.4	91.7	91.7	91.9	92.1	92.0	91.8	91.4	91.6	91.3	91.7	91.1	91.6	91.5	91.5
B1-15	83.9	84.0	84.8	85.0	85.0	85.3	85.3	85.6	85.8	85.3	85.4	85.0	85.3	85.0	85.2	85.3	85.3
B1-16	79.3	79.8	79.8	80.7	80.7	81.1	81.4	81.7	82.1	81.5	81.8	81.2	81.6	81.1	81.6	81.5	81.3
B1-17	79.4	78.8	81.4	81.1	81.9	82.1	79.9	80.9	80.9	80.4	80.8	80.3	80.7	80.3	80.6	80.4	81.9
B1-18	82.9	83.0	84.1	84.4	84.7	85.1	85.5	85.7	85.3	85.5	85.4	85.7	85.3	85.7	85.3	85.3	85.3
B1-19	81.2	80.9	81.5	81.8	81.8	82.1	82.2	82.2	82.3	81.8	81.9	82.2	81.9	82.2	81.8	82.0	82.0
B1-20	82.2	82.2	82.3	82.5	82.6	82.8	83.1	83.3	83.4	82.8	83.0	82.6	82.9	82.6	82.8	82.8	82.7
B1-21	76.3	82.1	87.1	90.9	93.5	95.5	97.1	97.8	99.2	99.6	100.5	100.9	101.5	101.2	101.8	101.1	101.5
B1-22	38.3	45.2	51.9	57.8	62.5	66.1	68.9	70.9	73.1	74.4	75.4	76.9	77.8	78.2	78.9	78.7	79.3
B1-23	10.2	22.1	33.5	43.9	51.6	57.7	62.0	64.4	67.1	68.5	70.2	71.2	72.3	73.3	74.1	73.7	74.5
B1-24	25.8	40.6	51.8	61.3	68.1	72.8	75.3	77.2	78.7	79.5	80.5	81.0	81.8	82.4	83.2	82.9	83.5
B1-25	68.0	70.7	73.2	75.2	74.8	77.5	78.4	78.8	79.4	79.3	79.6	80.1	80.4	80.4	80.6	80.1	80.3
B1-26	74.9	81.6	84.7	89.4	91.5	93.5	94.4	96.5	98.1	98.4	99.2	97.9	98.6	98.4	99.0	99.6	99.3
B1-27	70.1	78.6	84.1	90.3	94.2	97.6	100.1	102.7	101.1	106.2	107.6	107.3	108.4	108.5	109.4	109.9	109.6
B1-28	84.4	85.9	86.9	87.3	87.7	88.5	89.0	89.2	88.8	89.2	88.7	89.1	88.7	89.1	89.0	88.5	88.5
B1-29	77.9	80.7	82.8	84.3	85.4	86.5	87.7	87.8	88.3	88.1	88.4	88.0	88.8	88.1	88.8	88.3	87.9
B1-30	82.8	83.9	84.8	85.2	87.1	86.1	87.0	86.9	87.4	87.1	87.4	87.0	87.7	87.0	87.7	86.8	86.8
B1-31	80.0	80.5	81.2	82.0	82.3	82.7	82.7	82.9	83.1	82.8	82.9	83.1	83.1	82.8	83.1	82.7	83.1
B1-32	74.8	75.4	78.0	79.0	79.8	80.4	82.2	81.1	81.3	81.1	81.6	82.9	83.4	83.1	83.4	81.4	82.3
B1-33	71.3	72.7	75.5	76.9	77.9	78.6	80.2	79.3	79.9	79.8	80.2	81.3	81.6	81.4	81.8	80.2	80.8
B1-34	75.2	75.8	78.3	79.1	79.8	80.4	81.9	81.0	81.3	81.1	83.0	83.0	83.1	83.1	83.2	81.8	82.3
B1-35	63.8	67.3	72.3	74.9	77.0	68.5	80.3	80.3	80.9	81.2	81.6	83.4	83.3	83.5	83.5	82.8	83.5
B1-36	51.7	61.3	68.2	74.3	78.6	81.8	83.3	84.6	85.8	85.9	86.6	86.4	87.1	87.3	88.0	87.7	87.7
B1-37	52.9	58.3	62.0	65.1	67.4	69.1	69.8	70.5	71.2	71.0	71.2	71.2	71.6	71.6	72.0	71.8	71.9
B2-10	92.4	92.8	92.9	93.2	93.4	93.7	93.9	93.9	93.6	93.4	93.5	93.5	93.7	93.5	93.7	93.3	93.4
B2-11	76.3	77.8	78.9	80.1	80.9	81.7	82.3	82.8	83.1	82.9	83.1	83.1	83.6	83.4	83.7	83.3	83.4
B2-12	79.1	80.1	81.2	82.1	82.7	83.3	84.3	84.6	84.4	84.7	85.0	85.4	85.2	85.5	84.6	85.0	85.0
B2-13	81.3	81.3	81.6	81.9	82.0	82.3	82.6	82.7	82.8	82.4	82.5	82.6	82.9	82.7	82.9	82.4	82.7
B2-28	87.1	88.3	88.4	89.3	89.7	90.3	90.4	91.2	91.2	91.0	91.2	90.7	91.1	90.8	91.2	90.9	91.0
B2-30	80.5	81.0	82.5	83.3	83.8	84.3	85.2	84.9	85.0	84.8	85.1	85.9	86.0	86.0	86.0	85.6	86.1
B2-31	80.7	80.8	81.8	82.7	82.8	83.3	83.9	83.9	84.1	83.7	83.9	84.1	84.6	84.4	84.6	84.1	84.4
83	77.8	92.3	95.3	80.4	81.5	82.4	82.5	83.4	83.4	83.4	83.7	83.1	84.1	83.9	84.4	82.3	83.0
84	91.2	97.2	96.4	97.6	98.6	99.8	100.7	101.4	101.4	101.3	101.5	101.8	102.7	102.6	103.0	101.1	101.8
Differential Temperatures (F)																	
T2-T3	9.29	8.19	7.43	6													



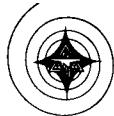
## Test Data in Degrees F - Test Run 2

Thermo-couple No.	Elapsed Time (Minutes)						Thermo-couple No.	Elapsed Time (Minutes)					
	24	80	174	180	194	200		24	80	174	180	194	200
1	107.5	107.3	108.2	107.5	107.8	107.9	B1-25	83.1	82.8	83.8	84.1	84.0	83.7
2	105.9		106.2	105.5	106.0	106.1	B1-26	100.5	102.7	102.4	102.1	102.4	103.5
3	98.9	100.8	99.7	100.9	101.0	101.4	B1-27	112.1	110.3	114.3	113.6	114.0	115.1
3A	98.1	92.2	96.8	98.6	99.1	99.6	B1-28	95.0	94.9	96.1	95.1	95.0	96.1
4	95.9	98.6	98.5	99.4	99.6	98.7	B1-29	94.0	97.5	95.3	94.5	94.2	94.6
5	105.7	106.5	107.3	107.7	107.4	107.6	B1-30	91.8	92.8	92.9	93.1	92.8	92.4
6	105.2	105.2	109.6	107.8	107.2	110.0	B1-31	87.2	87.3	88.0	87.3	87.4	87.7
7	105.4	107.1	108.3	107.3	106.5	108.1	B1-32	85.5	88.7	85.8	87.4	87.3	85.7
8	87.6	92.6	89.1	89.1	88.6	90.2	B1-33	83.9	85.3	84.0	85.2	85.5	84.8
A1-10	106.0	107.3	107.3	107.0	107.0	107.5	B1-34	86.4	83.8	87.3	87.4	87.8	88.0
A1-11	106.6	104.7	107.3	107.5	108.0	107.8	B1-35	85.4	85.2	86.1	85.9	86.2	86.9
A1-12	108.1	108.4	109.2	109.7	110.1	109.0	B1-36	89.9	89.9	89.4	89.5	89.5	89.2
A1-13	94.5	97.3	95.9	96.1	96.5	95.3	B1-37	76.3	77.0	76.8	76.9	76.8	76.9
A1-28	109.0	108.0	110.5	110.8	111.0	110.3	B2-10	102.1	103.3	103.1	103.2	103.2	103.3
A1-30	107.7	107.9	109.2	109.3	109.3	109.2	B2-11	88.0	89.1	89.2	89.3	89.5	89.5
A1-31	100.6	104.4	102.1	102.1	101.8	102.2	B2-12	89.3	90.0	91.0	90.8	91.1	91.1
A2-10	106.0	107.3	106.9	106.9	106.9	107.8	B2-13	87.3	88.1	88.3	88.3	88.4	88.5
A2-11	118.1	116.5	118.9	119.0	118.8	120.0	B2-28	97.8	98.1	98.4	99.5	98.9	98.7
A2-12	124.4	124.8	124.8	124.8	125.1	125.7	B2-30	90.3	91.2	91.3	92.0	91.8	91.8
A2-13	102.0	102.6	103.3	103.4	103.5	103.3	B2-31	88.9	89.3	89.7	90.1	90.1	90.1
A2-28	121.6	122.4	122.5	122.6	122.7	122.7	83	89.0	92.4	88.8	88.0	88.8	89.7
A2-30	119.5	120.7	120.7	120.8	120.9	121.0	84	110.0	111.0	110.0	109.8	109.9	111.4
A2-31	116.6	117.4	117.6	117.7	117.9	117.9	Differential Temperatures (F)						
B1-9	97.7	98.4	98.5	98.5	98.7	98.8	T2-T3	6.34	6.51		6.14		5.74
B1-10	100.3	102.5	101.4	101.4	101.5	101.8	T5-T6	0	0.86		0.65		0.68
B1-11	90.6	91.0	91.3	91.4	91.5	91.7	T7-T8	17.83	18.39				17.61
B1-12	91.3	91.6	91.7	91.9	92.0	92.0	Flow Distribution (Pounds per Hour)						
B1-13	83.3	84.0	83.7	84.0	84.2	84.2	W1	200	200	200	200	200	200
B1-14	100.0	100.8	100.7	100.8	100.9	100.9	W2	189	189	189	191		190
B1-15	90.4	90.9	91.1	91.2	91.2	91.1	W5	95	89	89	96		96
B1-16	85.9	86.4	86.6	86.5	86.6	86.6	W7	100	108	105	104		105
B1-17	85.0	84.7	84.7	85.9	86.1	86.6	Pressures (Pounds per Square Inch)						
B1-18	90.4	90.6	90.9	90.9	91.0	91.0	P2						22.0
B1-19	87.2	87.4	87.8	87.7	87.7	87.8	P3						21.0
B1-20	88.6	89.6	89.1	89.1	89.2	89.6	P2-P3	0.80	0.80	0.80	0.80	0.80	0.80
B1-21	102.8	103.9	103.3	103.7	103.8	103.9							
B1-22	80.4	80.8	81.8	82.0	82.2	82.1							
B1-23	75.8	76.4	75.7	75.4	75.2	75.6							
B1-24	84.8	85.6	84.7	84.6	84.4	84.7							



## Test Data in Degrees F - Test Run 3

Thermocouple No.	Elapsed Time (Minutes)																							
	10	20	33	40	50	60	70	80	90	100	110	120	130	140	151	160	170	185	191	200	210	220	230	240
1	104.3	98.5	86.5	84.2	77.8	75.3	76.1	76.0	75.7	75.7	77.1	78.0	77.0	77.9	77.9	78.0	77.3	77.1	78.1	77.2	77.2	77.2	77.2	
2	104.5	99.5	87.3	85.9	78.3	74.9	75.4	75.0	75.7	75.6	75.8	73.8	77.9	75.3	77.0	77.9	74.9	74.7	77.7	75.8	75.8	75.5	50.4	
3	101.6	86.9	74.3	69.1	61.9	57.9	52.2	55.0	52.9	52.5	52.5	51.9	52.1	51.8	52.3	51.6	51.5	51.4	51.2	51.2	51.0	51.0	52.3	
3A	99.4	89.1	75.2	70.9	62.9	54.1	54.1	54.1	54.1	53.9	54.1	53.5	53.6	51.8	52.4	51.0	51.3	51.8	52.2	52.2	51.4	51.4	52.4	
4	97.8	87.7	76.6	70.1	64.6	59.7	57.9	53.3	54.1	54.1	53.1	50.5	53.9	50.9	54.5	50.8	52.3	53.6	53.9	50.9	51.4	51.0	51.5	
5	103.7	98.4	91.3	82.8	78.7	77.1	79.1	74.8	76.6	76.8	76.9	74.5	77.9	80.3	76.2	78.6	79.1	80.3	80.8	77.9	78.1	77.9	77.9	77.9
6	106.0	88.8	76.7	72.5	65.8	61.2	56.9	55.9	56.7	56.4	55.9	55.5	55.2	55.0	52.3	52.1	54.1	56.4	52.4	51.7	51.7	50.7	51.5	53.5
7	102.7	97.5	90.4	83.7	80.0	77.9	77.2	76.5	77.5	77.4	75.7	76.5	77.9	77.4	78.3	77.5	79.3	77.2	79.3	77.6	77.1	76.3	79.0	79.0
8	89.2	76.3	66.9	62.7	56.9	52.2	49.6	49.4	48.8	48.1	47.6	47.9	47.8	47.8	47.9	48.5	48.8	48.1	47.9	48.0	47.2	47.6	47.4	47.4
A1-10	105.7	97.3	87.0	82.7	76.9	73.1	71.8	71.8	71.8	71.8	71.8	72.0	72.0	72.0	72.3	72.3	72.3	72.3	72.3	71.8	71.3	70.5	70.1	70.4
A1-11	105.3	84.7	67.0	61.5	52.9	47.1	43.5	42.8	41.3	39.9	39.7	38.4	39.7	38.4	39.2	38.3	38.8	38.1	38.0	37.3	36.9	36.7	36.5	36.3
A1-12	107.5	86.9	70.6	65.9	58.1	52.8	50.7	50.0	49.2	48.3	49.0	48.5	47.9	47.4	46.0	45.9	44.9	44.9	44.9	44.1	43.6	43.6	42.6	42.6
A1-13	93.9	73.6	61.1	56.8	50.2	45.4	43.0	42.2	41.3	41.2	41.1	40.2	40.1	40.0	40.8	41.0	40.1	40.1	40.1	39.9	40.1	40.2	39.7	39.0
A1-14	107.5	90.5	75.6	69.4	61.5	57.0	52.3	52.9	52.3	51.7	51.7	50.8	50.9	50.9	50.6	50.8	50.5	50.4	50.1	49.9	49.7	49.7	49.7	49.7
A1-15	107.0	87.1	71.7	65.4	57.8	52.6	50.4	48.3	47.6	47.2	47.0	46.2	46.7	44.8	43.6	43.0	42.6	42.5	41.6	41.4	41.4	41.2	41.2	41.2
A1-16	98.6	76.6	62.3	55.3	48.8	43.8	40.7	38.1	37.6	37.4	36.1	35.9	36.2	34.7	34.4	34.6	34.0	34.7	34.4	33.3	33.2	32.9	33.3	33.3
A1-17	96.5	87.9	82.2	76.9	74.0	73.2	72.3	72.3	72.3	72.3	72.3	72.4	72.4	72.4	72.5	72.5	72.5	72.5	72.5	72.4	71.7	71.3	71.2	72.1
A1-18	104.9	96.5	87.0	82.2	76.9	73.4	67.8	64.7	63.3	62.7	61.6	60.4	60.2	59.5	59.5	59.2	59.5	59.2	59.5	58.8	58.0	57.8	57.3	57.3
A1-19	116.6	100.5	87.0	80.6	73.4	67.8	64.7	63.3	62.7	61.6	60.4	60.4	60.2	60.2	60.2	63.3	63.3	62.8	63.1	62.6	62.1	61.5	61.5	61.5
A1-20	122.1	105.8	91.4	85.2	77.9	71.8	66.2	67.5	66.3	64.9	64.4	64.4	63.2	63.3	63.3	62.8	62.8	63.1	63.3	62.5	62.5	61.5	61.5	61.5
A1-21	101.2	83.1	72.7	68.6	62.7	58.0	56.0	55.0	54.5	54.1	54.9	54.7	54.6	54.4	54.9	54.9	54.8	54.9	54.8	54.3	54.3	54.0	53.9	53.9
A1-22	89.1	74.3	64.8	60.6	54.7	50.0	49.0	48.2	47.7	47.6	47.1	46.5	47.1	47.0	47.1	47.0	47.1	47.0	47.1	46.9	46.9	46.7	46.6	46.6
A1-23	119.7	105.2	91.5	86.0	78.7	74.3	70.5	70.5	69.8	69.5	69.8	69.3	69.3	69.3	69.3	69.3	69.3	69.3	69.3	68.8	68.8	68.7	68.7	68.7
A1-24	118.9	103.2	90.4	83.5	75.6	70.3	67.9	66.6	65.4	64.8	64.5	64.0	63.8	63.6	63.6	63.6	63.6	63.6	63.6	62.8	62.8	62.4	61.8	61.9
A1-25	95.8	83.6	79.2	73.2	69.9	65.7	63.5	61.5	60.9	60.6	60.2	60.0	59.7	59.7	60.0	59.9	59.7	59.7	59.3	59.1	58.9	58.5	58.4	
A1-26	91.0	95.1	82.7	77.4	72.7	67.5	64.0	63.0	62.3	62.1	62.1	62.1	62.1	62.1	62.1	62.1	62.1	62.1	62.1	62.1	62.1	62.1	62.1	62.1
B1-1	96.5	87.4	77.3	73.3	67.5	64.0	60.6	59.5	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8
B1-2	100.1	93.3	84.1	79.9	73.9	70.6	69.8	69.5	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7
B1-3	83.5	70.6	62.2	58.1	54.5	49.5	47.6	46.3	46.3	46.3	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1
B1-4	87.6	72.5	61.4	56.7	50.9	46.5	43.9	43.0	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6
B1-5	87.9	71.4	64.8	60.6	56.2	52.3	48.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3
B1-6	81.6	66.4	58.8	55.0	49.5	45.4	43.0	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3
B1-7	99.6	92.5	83.6	79.2	73.2	69.9	65.7	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5
B1-8	88.7	73.8	66.3	62.2	56.9	52.5	49.5	45.5	43.3	42.8	42.3	42.0	41.9	41.6	41.6	41.9	42.7	42.7	42.7	42.7	42.7	42.7	42.7	42.7
B1-9	83.7	68.2	59.5	55.3	50.9	45.5	43.3	42.8	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3
B1-10	100.1	93.2	84.1	79.9	73.9	70.6	69.8	69.5	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7	69.7
B1-11	83.5	70.6	62.2	58.1	54.5	49.5	46.3	43.9	43.0	42.6	42.1	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6
B1-12	87.9	71.4	64.8	60.6	56.2	52.3	48.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3
B1-13	85.6	72.6	65.9	61.5	57.9	52.7	47.5	44.3	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	
B1-14	95.8	77.0	69.4	65.0	60.5	55.9	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5
B1-15	88.2	74.7	65.8	61.5	57.9	52.7	48.3	45.1	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	
B1-16	87.7	73.8	66.3	62.2	56.9	52.5	49.5	46.3	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	
B1-17	83.7	68.2	62.2	58.1	54.5	49.5	46.3	44.1	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	
B1-18	87.9	71.4	64.8	60.6	56.2	52.3	48.3	45.1	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	42.9	
B1-19	85.6	72.6	65.9	61.5	57.9	52.7	49.5	46.3	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	
B1-20	87.7	72.2	69.1	60.4	51.8	44.7																		



## Test Data in Degrees F - Test Run 3 (Cont)

Thermocouple No.	Elapsed Time (Minutes)												Differential Temperatures (F)											
	10	20	33	40	50	60	70	80	90	100	120	130	133	140	151	160	170	185	191	200	210	220	230	240
T2-T3	-	13.28	-	15.89	-	19.77	-	20.72	-	22.06	-	22.59	-	23.82	-	23.45	-	23.83	-	24.07	-	24.23	-	24.35
T5-T6	-	10.72	-	14.02	-	19.46	-	20.24	-	21.95	-	22.90	-	23.83	-	23.49	-	24.39	-	24.56	-	24.83	-	24.92
T7-T8	-	22.41	-	22.41	-	25.42	-	26.55	-	27.60	-	28.04	-	29.35	-	28.76	-	29.01	-	29.15	-	29.23	-	29.40
W1	200	200	-	200	-	187	-	186	-	200	-	186	-	185	-	200	-	187	-	186	-	200	-	200
W2	-	187	-	96	-	90	-	100	-	93	-	93	-	92	-	96	-	92	-	90	-	89	-	84
W5	-	-	103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90
W7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
P2	22.0	-	-	-	-	22.5	-	-	-	23.0	-	-	-	23.0	-	-	-	23.0	-	-	-	-	-	-
B3	21.0	-	-	-	-	21.0	-	-	-	21.5	-	-	-	21.5	-	-	-	21.5	-	-	-	-	-	-
P2-P3	0.80	-	-	0.95	-	1.27	-	1.2	-	1.3	-	1.3	-	1.3	-	1.3	-	1.3	-	1.3	-	1.3	-	1.3



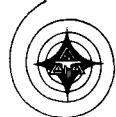
### Test Data in Degrees F - Test Run 4

Thermocouple No.	Elapsed Time (Minutes)															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
1	77.1	80.0	83.7	87.9	90.7	94.8	97.8	101.5	103.9	106.5	107.3	107.3	106.6	108.4	107.3	108.1
2	76.1	77.2	82.0	85.3	87.6	93.4	96.2	99.3	100.6	104.9	104.8	104.0	103.7	105.7	104.6	104.8
3	51.0	51.0	52.8	54.9	57.7	60.0	62.6	64.3	66.7	68.5	70.1	70.4	70.9	70.8	71.6	71.9
3A	50.1	51.9	50.9	54.7	55.4	59.3	60.2	64.5	63.9	67.5	70.4	71.3	68.9	71.3	69.4	68.8
4	51.4	52.8	52.4	54.2	58.9	57.5	60.9	61.5	66.5	65.8	68.2	69.7	69.5	69.0	72.6	72.1
5	77.9	80.7	83.6	88.2	90.9	92.3	95.9	99.9	102.4	103.9	106.8	107.0	104.1	107.9	108.2	107.5
6	49.9	54.1	53.9	56.5	58.2	61.4	63.2	65.9	67.9	69.8	71.7	72.5	71.8	72.7	73.2	73.2
7	77.0	81.3	82.7	88.8	90.5	93.4	96.5	100.5	103.2	104.9	107.1	107.3	104.7	108.0	107.9	107.2
8	47.5	47.6	49.3	51.9	53.6	57.2	59.2	61.8	62.7	65.7	67.4	68.0	67.9	68.7	68.6	68.5
A1-10	70.2	72.0	75.0	78.8	81.3	84.9	87.7	90.8	93.1	95.7	96.8	96.9	96.2	98.0	98.1	97.8
A1-11	36.4	36.6	38.5	40.7	42.9	45.8	47.8	49.7	51.1	53.8	55.2	55.6	56.1	56.5	56.7	56.9
A1-12	43.4	43.4	46.2	47.8	50.5	53.1	55.7	57.3	59.3	61.8	62.7	63.1	63.7	64.0	64.5	64.6
A1-13	39.6	39.4	41.4	43.1	46.1	48.6	50.7	52.5	54.8	56.7	57.9	58.6	59.3	58.9	60.1	60.5
A1-28	49.8	50.8	52.9	55.6	58.6	60.8	63.5	65.4	67.9	70.0	71.2	71.6	72.5	73.4	73.3	73.3
A1-30	41.2	42.1	44.0	46.9	49.9	52.1	55.0	57.3	59.6	61.7	63.4	63.8	64.6	65.5	65.4	65.4
A1-31	32.8	33.8	34.2	36.8	39.0	40.7	42.7	44.8	46.9	48.5	50.5	51.4	51.0	51.9	52.4	52.6
A2-10	71.2	73.9	76.4	80.8	83.2	86.0	89.1	92.4	94.9	97.1	98.8	99.0	97.7	99.7	100.0	99.6
A2-11	56.9	58.2	60.1	63.0	64.7	67.3	69.6	72.0	73.4	75.6	77.3	77.5	77.2	77.9	78.2	78.2
A2-12	61.3	62.3	64.4	67.2	68.7	71.5	73.6	76.2	77.5	79.7	80.9	81.1	81.0	81.9	81.9	81.9
A2-13	53.7	54.6	56.4	59.4	61.9	64.2	66.7	68.8	70.9	72.8	74.4	74.9	74.7	75.3	75.9	76.0
A2-28	68.1	69.7	72.0	75.3	77.6	80.3	82.9	85.3	87.6	89.5	90.9	91.0	90.4	91.7	92.1	91.9
A2-30	61.7	63.0	65.2	68.5	70.8	73.4	76.0	78.3	80.4	82.6	83.9	84.0	83.8	84.7	85.1	85.1
A2-31	58.3	59.0	60.9	63.5	65.5	68.0	70.1	72.2	74.0	76.1	77.3	77.8	77.7	78.5	78.5	78.5
B1-9	62.6	63.8	66.6	69.7	72.2	75.4	78.3	80.8	83.2	85.4	86.4	86.6	86.5	87.3	88.0	88.0
B1-10	70.7	71.8	75.5	78.7	81.7	85.1	88.2	90.8	93.6	96.2	96.6	96.9	96.8	97.8	98.6	98.4
B1-11	39.4	40.1	40.5	42.8	43.9	46.8	48.3	50.4	51.2	53.2	54.8	55.1	55.1	55.6	56.1	56.2
B1-12	46.3	45.6	47.0	49.9	51.8	53.9	55.7	57.9	59.3	61.4	62.8	63.1	62.9	63.4	64.0	63.9
B1-13	42.9	42.2	43.6	46.3	48.7	51.2	53.3	55.4	56.9	59.5	60.9	61.7	61.8	61.7	62.3	62.5
B1-14	70.1	71.6	74.7	78.3	81.3	84.4	87.6	90.5	93.2	95.6	96.7	96.8	96.4	97.7	98.4	98.1
B1-15	50.4	48.9	50.6	53.4	56.1	58.6	61.0	62.9	65.0	67.3	68.7	69.3	69.3	69.7	70.4	70.4
B1-16	41.6	41.0	42.6	44.7	47.3	49.9	52.2	53.7	55.8	57.9	59.0	59.6	59.9	59.9	60.2	61.1
B1-17	47.2	48.5	49.6	54.1	55.2	57.6	59.8	62.6	64.2	66.6	68.7	70.4	68.9	69.5	69.0	68.2
B1-18	44.7	43.1	44.2	46.7	49.3	51.4	53.2	54.9	56.9	58.8	60.5	60.9	61.0	61.4	62.0	62.2
B1-19	51.3	50.8	52.5	55.8	58.2	60.9	63.2	65.7	67.5	69.8	71.5	71.9	71.6	72.0	72.7	72.7
B1-20	55.1	55.7	59.7	61.2	63.9	66.7	69.3	72.0	74.1	76.5	78.1	78.3	78.2	78.7	79.5	79.4
B1-21	1.9	1.9	1.5	2.0	1.8	2.2	2.4	3.4	3.8	4.3	5.5	6.1	6.4	6.6	6.8	7.0
B1-22	-15.3	-15.9	-16.4	-17.1	-18.3	-18.2	-19.1	-19.2	-19.9	-19.6	-19.9	-20.0	-20.0	-20.2	-20.3	-20.2
B1-23	-10.7	-11.6	-12.2	-13.0	-13.9	-14.3	-14.9	-15.2	-15.8	-15.9	-16.4	-16.5	-16.4	-16.8	-16.7	-16.9
B1-24	5.8	5.5	5.2	5.1	5.2	5.7	6.1	6.6	7.3	7.9	8.5	9.2	9.9	10.1	10.4	10.6
B1-25	16.0	15.4	15.5	16.2	17.3	18.6	19.7	20.7	22.0	23.3	23.8	24.7	24.8	25.1	25.6	26.1
B1-26	10.2	10.8	9.2	9.6	9.1	9.5	9.9	11.2	11.3	12.4	13.6	14.1	14.0	14.4	15.0	15.4
B1-27	7.5	7.5	6.3	5.2	3.6	3.7	3.2	3.9	3.1	3.9	4.1	4.3	4.6	4.0	5.0	5.7
B1-28	46.0	48.6	49.3	51.4	53.2	56.0	57.9	60.1	61.3	63.6	64.5	65.2	65.3	65.4	66.0	66.1
B1-29	49.7	48.6	51.5	53.4	55.6	58.5	60.7	62.4	64.1	66.4	66.4	67.2	67.3	67.7	68.5	68.5
B1-30	45.3	44.6	46.5	48.6	51.0	53.5	55.4	57.3	59.0	61.4	61.9	62.3	62.7	63.1	64.0	64.1
B1-31	36.9	36.4	38.0	39.7	41.3	44.5	45.9	47.9	49.0	51.2	51.9	53.4	53.9	52.8	53.7	54.0
B1-32	28.0	27.0	27.2	28.7	31.1	32.0	33.6	34.3	36.7	37.8	38.9	38.9	38.8	40.5	40.8	40.9
B1-33	22.1	22.1	21.3	23.1	24.6	25.5	26.8	28.1	29.7	30.9	32.5	32.4	32.3	33.2	33.6	33.8
B1-34	28.8	29.6	29.7	32.4	33.6	35.0	37.0	38.9	40.9	41.9	44.1	44.1	44.2	45.0	45.2	45.1
B1-35	5.0	5.5	5.0	6.4	6.1	6.8	7.5	9.2	9.3	10.1	11.7	12.2	12.0	12.2	12.1	12.3
B1-36	17.2	15.7	15.5	15.9	17.0	17.5	18.5	18.9	20.5	21.1	21.8	22.0	22.5	23.0	23.4	23.4
B1-37	29.1	29.1	30.0	31.8	33.4	35.2	37.0	38.5	40.5	41.8	43.1	43.6	43.8	44.3	44.5	44.8
B2-10	71.9	73.6	76.8	80.4	83.4	86.3	89.7	92.3	95.4	97.3	98.7	98.7	98.1	99.9	100.1	100.1
B2-11	46.5	47.8	49.8	52.5	54.6	57.1	59.5	61.9	63.6	65.9	67.4	68.0	67.9	68.7	69.2	68.8
B2-12	44.2	45.4	47.6	50.4	52.1	54.8	57.0	59.6	61.0	63.4	65.0	65.4	65.6	66.2	66.5	66.7
B2-13	48.9	49.6	52.0	54.7	57.3	60.2	62.7	65.0	66.9	69.4	70.7	71.4	71.2	71.5	72.3	72.3
B2-28	58.2	57.4	62.2	62.8	67.7	70.4	73.8	73.5	77.8	80.3	79.2	79.2	79.9	82.1	83.2	82.8
B2-30	47.9	48.8	51.3	53.7	56.9	59.1	62.0	63.7	66.3	68.8	69.7	69.8	69.9	71.4	72.0	71.8
B2-31	43.5	43.8	46.2	48.6	51.4	53.9	56.2	58.2	60.4	62.8	63.8	64.5	64.5	65.1	66.0	65.9
83	44.0	45.0	46.9	49.8	51.0	54.2	56.1	59.0	59.4	61.7	63.3	64.9	64.6	64.0	65.2	65.2
84	49.9	50.5	53.1	55.3	57.2	60.4	62.4	64.7	65.6	68.2	69.0	70.6	70.8	70.4	71.2	71.3
Differential Temperatures (F)																
T2-T3		27.57		30.08		31.39		33.35		33.91		33.05		33.98		33.11
T5-T6		28.30		30.24		32.22		34.23		37.22		33.79		34.67		34.01
T7-T8	-	31.60	.	36.78		36.56		38.46		39.25		38.10		39.06		38.36
Flow Distribution (Pounds per Hour)																
W1		200		200		200		200		200		200		200		200
W2		186		187		188		191		188		189		185		190
W5		99		97		93		96		95		96		100		93
W7		101		108		100		105		102		104		108		107
Pressures (Pounds per Square Inch)																
P2								22.00		22.00		22.00		22.00		20.00
P3								21.00		21.50		21.00		21.00		20.50
P2-P3								0.95		0.93		0.93		0.93		0.90



## Test Data in Degrees F - Test Run 5

Thermo-couple No.	Elapsed Time (Minutes)																				
	12	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	195	
	95.8	96.6	96.4	96.4	95.6	95.8	95.7	95.3	94.9	95.8	95.3	96.0	95.9	96.4	95.6	96.1	96.2	95.9	96.3		
1	93.9	95.0	95.9	96.0	94.1	94.5	93.2	95.1	93.7	95.4	94.4	95.4	93.8	93.2	93.9	94.0	94.3	95.3	92.9	94.4	
3	85.0	84.7	81.7	78.7	76.3	75.4	74.3	73.9	76.2	77.7	78.9	80.3	83.9	82.8	78.6	76.3	75.7	77.0	80.2	81.9	
3A	83.7	83.1	82.8	78.5	76.2	75.0	71.5	72.0	71.9	78.5	75.6	78.8	83.4	81.2	76.6	73.4	71.9	72.5	76.9	79.0	
4	84.5	84.4	80.2	75.7	75.4	73.4	73.3	70.3	73.4	75.5	77.0	77.4	82.1	83.8	79.8	76.3	74.2	72.9	78.6	79.4	
5	97.3	97.5	96.5	95.2	97.1	96.8	97.0	93.6	94.1	94.2	94.0	93.6	95.3	97.5	97.4	96.2	95.7	94.6	98.4	94.9	
6	84.3	86.6	85.4	83.5	82.6	81.9	81.6	80.6	80.4	80.6	80.1	84.6	85.6	83.6	82.1	81.4	80.7	84.2	84.0		
7	96.4	97.5	96.8	95.9	96.6	96.7	96.5	94.8	94.1	95.5	94.3	90.4	95.0	96.6	96.7	96.0	95.8	95.3	94.6	95.2	
8	83.4	81.7	74.2	69.1	65.8	64.0	62.4	62.2	65.8	72.5	74.7	77.7	79.9	76.5	69.1	65.7	64.1	67.7	70.6	77.5	
A1-10	92.2	92.3	91.9	91.2	90.5	90.2	90.2	90.8	91.2	92.0	91.6	92.3	91.8	91.3	90.8	90.6	91.2	91.8	92.4		
A1-11	81.0	82.2	81.8	80.3	79.1	78.5	78.2	78.1	77.3	76.2	77.2	79.8	82.4	82.1	79.0	76.2	74.7	75.8	78.1	80.7	
A1-12	80.0	79.4	77.9	76.7	75.4	74.9	74.7	75.5	77.4	75.4	76.7	78.4	80.1	78.2	76.2	74.5	73.7	75.0	77.3	79.2	
A1-13	77.8	77.9	75.8	74.3	73.5	72.9	72.9	73.2	74.9	71.6	72.0	74.3	78.2	77.2	74.6	73.7	73.3	74.6	77.4	77.9	
A1-28	87.8	88.8	88.1	86.6	85.7	85.2	84.9	84.1	83.6	82.2	83.8	85.5	88.6	89.0	86.3	83.7	82.2	82.3	85.7	86.5	
A1-30	81.9	82.6	81.2	79.5	78.9	78.3	78.2	77.6	77.4	79.2	82.0	81.9	79.4	77.2	75.9	75.8	80.1	80.1			
A1-31	77.7	79.2	77.3	74.9	74.3	73.9	73.6	72.4	73.0	71.0	71.1	74.0	77.9	78.1	74.7	72.4	71.1	71.6	77.0	76.1	
A2-10	92.8	93.5	92.9	91.7	91.5	91.5	91.3	91.0	90.9	91.8	91.3	91.7	91.7	92.3	92.1	91.6	91.3	91.5	93.1	92.6	
A2-11	89.5	91.3	90.2	88.2	86.2	85.1	84.4	84.3	85.1	84.8	84.0	85.6	89.0	89.4	87.4	85.9	85.1	87.7	89.0		
A2-12	93.7	95.5	95.0	93.1	90.6	90.1	89.2	89.3	89.6	89.2	90.6	94.3	94.5	93.0	91.3	90.4	91.1	92.9	94.8		
A2-13	84.4	85.9	84.8	82.9	82.0	81.4	81.2	81.2	82.2	79.7	78.6	80.1	84.8	85.2	83.1	82.2	81.9	82.5	85.3	86.1	
A2-28	96.5	97.7	96.8	95.0	93.8	93.0	92.4	92.2	92.6	92.4	93.6	96.7	96.9	95.7	94.3	93.5	93.8	96.2	97.0		
A2-30	93.3	94.5	93.7	91.7	90.2	89.4	88.6	88.7	89.4	88.4	89.7	93.2	93.5	91.9	90.6	89.9	90.0	92.3	93.3		
B1-9	89.9	88.0	84.5	81.9	80.1	79.0	78.3	78.7	81.6	84.3	86.1	87.8	88.0	85.7	83.1	81.0	80.0	83.1	86.6	87.9	
B1-10	93.4	92.1	90.0	88.8	87.6	86.9	86.9	88.1	89.7	90.9	91.7	92.3	91.9	91.9	90.4	89.5	88.4	88.3	89.8	91.8	
B1-11	86.9	82.2	73.4	66.1	60.5	56.5	53.7	53.9	64.0	71.2	77.0	81.0	81.5	75.1	66.8	65.6	65.6	74.9	77.9		
B1-12	91.3	87.3	77.2	68.6	63.0	59.6	57.4	58.9	67.7	76.6	80.9	84.0	85.0	78.6	68.2	62.3	59.1	63.1	74.8	79.6	
B1-13	76.4	72.8	65.0	59.8	57.0	55.8	55.0	55.9	63.0	68.5	70.7	73.0	73.4	68.0	60.3	57.2	56.1	63.1	71.4	73.3	
B1-14	91.5	90.7	89.1	87.9	87.3	87.0	86.8	87.4	88.6	89.5	90.0	90.5	90.3	89.2	88.5	87.9	87.7	88.8	90.3	90.8	
B1-15	84.2	81.5	73.6	67.8	64.9	63.3	62.2	62.7	69.7	75.4	77.3	80.0	81.6	76.3	67.9	64.8	63.5	68.9	78.6	80.8	
B1-16	79.3	74.9	66.7	60.4	57.3	55.1	53.9	54.2	62.8	68.8	72.0	75.1	75.2	69.5	61.6	57.3	55.5	63.4	72.2	74.2	
B1-17	77.5	75.6	68.9	65.7	63.2	62.7	61.8	61.4	66.1	71.4	72.4	74.5	75.8	71.0	66.0	65.6	65.6	74.9	74.6		
B1-18	85.4	81.9	72.5	64.8	60.0	57.5	56.2	56.5	67.7	73.5	76.8	80.0	81.3	74.9	64.9	59.9	57.2	64.4	76.0	79.1	
B1-19	80.6	78.3	71.4	67.1	65.0	64.1	63.6	64.4	69.4	73.6	75.2	77.3	78.6	73.7	67.2	65.1	64.6	69.1	76.6	78.6	
B1-20	81.4	79.1	74.3	71.8	70.6	70.0	69.7	70.6	74.4	76.8	78.0	79.5	79.9	76.0	72.1	71.0	70.6	74.5	79.0	80.2	
B1-21	140.0	124.0	80.0	49.7	26.8	10.7	-1.4	-8.9	1.2	39.0	73.1	108.5	118.3	92.5	56.1	29.0	10.6	25.9	77.8	98.7	
B1-22	113.1	103.1	75.2	53.8	35.2	19.1	5.2	-5.4	-3.6	16.2	38.5	61.8	73.6	61.7	42.6	25.4	10.5	16.0	44.2	57.1	
B1-23	124.3	105.1	78.9	56.3	36.5	19.2	8.7	26.6	52.1	74.2	89.6	97.8	78.6	58.9	39.3	21.7	7.3	4.6	25.5	40.3	
B1-24	139.9	111.5	77.1	51.0	31.0	16.1	10.7	47.4	82.8	102.5	112.8	117.6	86.5	60.1	37.4	19.7	7.4	11.4	49.0	70.4	
B1-25	94.8	87.7	67.6	49.7	37.4	29.0	23.0	20.9	35.0	54.1	68.4	73.9	80.8	70.9	50.7	36.8	27.6	36.4	58.4	67.7	
B1-26	143.8	129.7	88.2	58.6	37.5	23.2	12.5	7.7	35.0	73.4	101.7	103.7	121.1	94.6	59.6	36.1	20.6	35.4	83.0	103.0	
B1-27	161.6	149.8	109.4	76.2	50.5	31.2	15.9	7.9	28.6	69.4	102.2	107.8	129.4	109.5	73.2	45.8	25.9	34.2	79.4	103.1	
B1-28	90.3	85.6	78.2	72.0	67.5	63.8	61.4	61.4	68.8	73.9	79.2	84.7	85.2	79.6	73.6	68.0	64.7	72.0	78.6	81.9	
B1-29	100.6	93.4	81.1	71.1	65.5	61.2	59.2	64.8	77.0	84.4	88.8	93.0	89.3	80.5	70.4	64.3	60.6	62.8	75.5	82.2	
B1-30	90.5	86.0	77.7	70.2	65.9	62.2	60.0	60.7	70.1	75.5	79.8	83.7	83.9	79.3	71.1	65.7	62.3	67.2	77.6	80.2	
B1-31	80.8	75.0	65.6	58.2	53.9	50.7	48.7	50.1	61.1	67.8	72.3	76.3	75.6	68.6	60.0	54.3	51.5	61.3	71.6	73.8	
B1-32	88.0	82.3	68.0	55.5	46.9	41.5	37.3	36.1	49.5	61.7	71.0	75.1	77.8	70.0	55.5	46.2	39.9	49.2	66.0	69.6	
B1-33	89.2	82.8	66.4	52.2	41.7	35.1	30.3	29.1	42.5	58.3	69.6	74.1	78.2	68.9	52.3	41.1	33.6	43.6	61.6	68.0	
B1-34	86.5	81.9	64.1	52.4	44.1	39.2	35.6	33.7	39.8	54.2	64.2	73.8	80.0	70.5	55.2	45.1	39.4	47.6	65.4	72.3	
B1-35	98.5	91.3	70.5	51.8	36.3	24.8	15.5	11.1	20.3	38.9	55.4	70.9	80.0	69.7	51.4	35.1	23.2	31.7	51.4	62.6	
B1-36	128.1	108.2	79.0	54.7	37.3	25.0	19.8	39.2	68.7	92.8	105.7	111.8	93.0	71.5	47.9	31.2	19.8	21.8	52.7	70.3	
B1-37	90.7	79.0	62.8	50.9	43.0	37.8	35.8	46.9	62.9	72.9	77.4	80.4	71.0	59.0	49.2	42.7	40.2	35.5	38.7	54.6	63.6
B2-10	93.9	92.8	91.0	90.0	89.1	88.7	85.5	89.1	91.0	91.7	92.1	92.8	91.2	90.9	90.4	89.6	89.3	90.4	91.8	92.2	
B2-11	87.2	83.8	76.7	72.1	68.5	65.8	63.4	64.3	69.6	72.5	76.3	80.3	80.7	76.1	71.4	67.8	65.3	69.5	74.5	76.4	
B2-12	87.7	85.5	76.7	71.7	67.9	64.7	62.1	60.9	62.6	68.5	72.4	77.4	82.1	78.5	71.9	67.7	64.8	68.6	74.9	77.8	
B2-13	80.0	76.3	67.1	64.1</																	



## Test Data in Degrees F - Test Run 6

Thermocouple No.	Elapsed Time (Minutes)																	
	10	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	
1	96.4	95.9	96.9	97.2	96.8	97.1	97.3	96.5	97.6	97.2	96.5	96.9	96.0	97.3	98.0	96.5	97.6	
2	97.5	93.3	95.2	95.8	95.6	95.2	94.5	94.3	96.0	95.6	93.9	94.8	93.2	94.5	96.8	93.8	96.0	
3	58.9	60.0	63.2	61.1	63.3	63.2	61.3	61.3	60.5	59.6	59.8	60.5	60.9	62.3	62.2	60.9	60.9	
3A	59.5	59.8	60.1	62.4	60.5	61.4	62.6	59.6	61.3	61.7	58.5	58.8	60.5	60.2	62.0	60.9	61.9	
4	62.7	62.2	59.4	60.6	62.8	61.4	62.4	62.2	59.1	59.4	61.0	59.6	61.6	63.1	60.6	64.1	59.7	
5	97.5	98.1	95.5	97.7	96.2	95.3	98.7	96.5	96.1	97.7	96.3	95.4	48.2	99.3	96.5	97.3	98.3	
6	61.8	61.5	61.7	62.8	63.1	63.4	63.5	62.3	61.9	61.5	61.2	60.9	61.8	62.3	63.6	63.6	62.0	
7	96.6	97.1	96.6	98.1	96.0	96.2	98.4	96.2	97.0	98.1	96.0	96.1	97.2	98.4	97.7	96.8	97.2	
8	58.0	58.3	59.3	60.0	60.1	59.8	59.3	58.8	58.4	58.5	58.1	58.5	59.0	59.3	60.4	59.0	59.0	
A1-10	86.6	86.3	87.2	87.3	87.2	87.6	87.7	87.3	87.6	87.3	86.5	86.8	86.6	87.9	88.8	87.4	87.7	
A1-11	41.6	39.3	40.7	42.6	44.9	45.9	43.9	42.3	40.3	38.2	37.0	37.2	38.9	41.2	44.2	44.1	42.3	
A1-12	51.5	50.6	51.3	51.8	53.7	54.0	53.0	52.5	51.0	49.4	49.6	49.8	50.6	51.9	53.7	53.6	52.0	
A1-13	49.0	49.5	50.6	51.3	52.2	51.7	50.3	50.3	49.1	48.7	49.3	49.4	50.8	51.4	51.8	51.8	49.7	
A1-28	59.0	57.4	57.4	59.5	61.2	61.5	60.7	59.2	57.1	55.8	55.1	54.9	57.2	59.3	60.5	60.7	58.6	
A1-30	51.0	49.5	49.5	51.3	52.4	53.1	53.2	51.6	49.4	48.0	47.1	46.8	49.3	50.7	52.8	53.1	51.0	
A1-31	39.4	38.7	39.3	41.9	42.0	42.4	42.1	39.9	38.8	38.0	36.4	36.8	38.5	40.1	41.7	41.7	40.2	
A2-10	88.6	88.7	88.9	89.6	88.9	89.2	89.9	88.5	89.5	89.7	88.4	88.8	88.8	90.6	89.3	89.9	89.9	
A2-11	67.2	66.0	66.9	67.6	68.0	68.4	68.5	67.8	67.7	67.1	66.3	66.4	66.5	67.5	69.0	68.3	68.1	
A2-12	69.9	68.6	69.6	70.1	70.9	71.2	70.3	69.7	69.4	68.7	68.5	68.7	68.7	69.9	71.1	70.2	69.7	
A2-13	65.6	65.5	66.0	67.0	67.3	67.1	66.6	66.1	65.8	65.7	65.6	65.7	66.4	67.1	67.8	67.3	66.2	
A2-28	78.3	77.4	77.8	78.4	79.0	79.2	78.6	78.1	77.7	77.4	77.0	77.0	77.5	78.7	79.2	78.6	77.9	
A2-30	72.8	71.8	72.1	72.9	73.4	73.9	73.7	73.1	72.4	72.2	71.9	71.6	72.3	73.3	74.0	73.6	72.9	
A2-31	66.9	66.0	66.6	67.7	68.4	68.4	67.5	66.8	66.3	66.0	65.8	66.0	66.6	67.5	68.6	68.1	66.8	
B1-9	76.5	76.7	77.3	77.9	78.2	77.9	77.2	77.0	76.7	76.5	76.4	76.8	77.5	78.4	78.4	77.5	76.9	
B1-10	87.1	87.2	87.3	87.4	88.0	88.1	87.8	88.2	87.4	87.3	87.4	87.3	87.7	89.0	88.8	88.4	87.6	
B1-11	43.7	42.9	44.3	45.7	46.5	45.7	44.3	43.2	41.8	40.8	40.7	41.5	43.6	44.7	45.3	44.1	42.3	
B1-12	51.4	50.7	51.7	52.7	53.6	54.1	53.7	52.8	51.7	50.9	50.4	50.5	51.4	52.4	54.0	53.6	52.3	
B1-13	51.3	52.2	52.9	53.9	54.3	53.7	53.0	52.5	52.1	52.0	52.1	52.5	53.7	54.0	54.5	54.0	52.6	
B1-14	87.2	87.1	87.7	87.8	87.9	88.0	87.9	87.7	87.8	87.7	87.4	87.6	87.7	88.8	88.8	88.2	87.9	
B1-15	57.9	58.5	59.3	60.8	61.2	60.8	60.0	59.2	58.8	58.5	58.4	58.7	60.0	60.7	61.5	60.9	59.4	
B1-16	49.3	49.9	50.4	51.9	52.0	51.4	50.7	49.9	49.4	49.2	49.0	49.4	51.1	51.6	51.8	51.3	50.0	
B1-17	58.8	59.4	60.8	61.2	61.9	60.9	60.1	60.1	60.2	59.9	60.9	60.8	61.0	61.3	62.5	60.8	60.3	
B1-18	49.0	49.1	50.2	51.8	52.3	52.1	51.2	50.0	49.3	48.7	48.8	48.8	50.4	51.1	52.3	51.7	50.0	
B1-19	61.8	62.3	62.9	63.8	64.2	64.0	63.1	63.1	62.7	62.5	62.7	62.8	63.8	64.3	64.9	64.2	62.9	
B1-20	68.8	69.2	69.7	70.4	70.4	70.1	69.8	69.8	69.4	69.6	69.6	69.7	70.4	70.9	71.2	70.5	69.7	
B1-21	-16.2	-18.1	-14.5	-10.9	-10.5	-13.6	-17.9	-21.1	-23.6	-25.4	-25.5	-23.0	-18.3	-15.0	-16.0	-19.2	-22.5	
B1-22	-30.0	-38.2	-39.0	-37.8	-38.8	-41.3	-44.8	-47.8	-50.9	-53.2	-54.8	-54.6	-52.1	-50.3	-50.8	-52.3	-54.7	
B1-23	-30.8	-38.9	-42.0	-43.2	-40.0	-34.9	-32.8	-34.4	-38.7	-42.3	-45.6	-48.4	-50.3	-48.8	-43.2	-41.5	-42.7	
B1-24	-8.8	-12.5	-13.5	-12.4	-7.5	-0.6	1.8	-2.0	-6.9	-10.6	-13.1	-15.0	-16.2	-12.1	-3.9	-3.4	-5.5	
B1-25	12.5	10.3	11.6	13.5	14.7	14.0	12.1	10.3	8.7	7.4	6.6	7.1	9.1	11.6	12.5	11.5	9.2	
B1-26	-2.4	-7.5	-5.3	-2.6	0.5	-1.5	-6.0	-8.4	-11.6	-13.7	-14.1	-13.6	-9.9	-5.0	-4.7	-7.0	-10.7	
B1-27	-10.4	-19.7	-19.7	-16.8	-14.2	-15.4	-20.3	-23.2	-27.7	-30.4	-31.8	-32.2	-28.0	-23.5	-22.6	-23.9	-28.5	
B1-28	54.5	52.3	54.0	55.5	55.8	55.2	53.9	53.3	51.8	51.3	50.9	51.5	54.3	55.0	54.5	53.9	52.0	
B1-29	55.5	54.9	54.1	55.5	56.4	58.3	58.6	57.5	55.8	55.0	53.6	53.4	54.6	55.4	57.4	57.8	56.4	
B1-30	50.8	50.2	50.5	52.9	52.7	53.1	52.9	51.4	50.5	49.7	48.4	48.8	51.0	50.9	52.6	52.1	51.0	
B1-31	42.2	42.4	42.7	44.6	44.8	44.6	43.1	42.4	41.2	40.7	39.8	40.6	43.5	44.0	43.7	43.7	41.8	
B1-32	27.3	26.2	28.5	29.7	30.3	29.0	28.5	26.2	25.8	24.4	24.2	25.3	26.0	28.0	29.5	26.5	26.3	
B1-33	20.4	18.6	20.7	22.1	23.6	22.2	21.0	19.1	17.9	16.6	16.6	17.3	18.5	20.8	22.0	20.2	18.6	
B1-34	31.6	31.5	33.5	34.4	36.0	34.2	32.1	31.5	30.4	29.7	30.4	31.2	32.7	35.2	34.8	33.3	30.9	
B1-35	1.3	-2.9	-2.0	-0.6	1.0	-0.1	-3.6	-4.8	-7.7	-9.3	-9.5	-9.0	-6.3	-3.6	-3.5	-4.3	-7.8	
B1-36	5.5	2.3	1.8	2.9	7.3	12.1	13.3	9.8	5.9	2.7	0.7	-0.7	-1.2	2.0	8.4	8.9	6.8	
B1-37	31.5	31.1	31.3	32.0	33.7	35.3	36.5	35.1	33.1	32.0	31.3	30.9	30.7	32.1	35.4	35.5	34.2	
B1-10	88.9	88.9	89.4	89.5	89.8	89.6	89.6	89.7	89.6	89.5	89.4	89.4	89.5	90.7	90.8	89.9	89.6	
B2-11	59.9	59.5	59.6	60.0	60.1	60.0	59.8	59.6	59.0	58.7	58.6	58.8	59.5	59.9	60.2	59.7	59.0	
B2-12	57.2	56.6	56.8	57.7	57.8	57.6	56.6	56.3	55.6	55.4	55.0	55.3	56.7	57.2	57.5	56.9	55.7	
B2-13	61.9	62.6	63.3	64.1	63.9	63.1	62.7	62.6	62.7	62.7	62.7	63.2	64.2	64.4	64.6	63.7	62.7	
B2-28	71.4	71.2	72.6	73.4	70.8	69.8	72.5	68.7	72.1	71.4	70.5	70.9	69.7	70.4	73.0	69.1	71.9	
B2-30	61.8	61.3	62.0	62.3	62.5	61.6	61.8	61.3	61.0	60.6	60.9	61.1	61.3	62.1	62.8	61.5	61.0	
B2-31	55.2	55.2	56.3	56.5	57.2	56.1	55.5	55.0	54.9	54.7	54.7	55.3	56.2	57.1	57.5	56.2	55.0	
83	55.2	55.5	54.9	56.6	55.4	55.9	55.7	54.9	54.5	54.5	53.7	53.9	55.0	54.9	56.2	55.3	55.1	
84	59.3	58.7	58.6	59.9	60.2	60.5	60.9	59.0	59.4	58.5	58.1	57.9	58.1	59.3	60.9	59.8	59.7	
Differential Temperatures (F)																		
T2-T3	33.46	33.87	34.03	32.78	32.34	32.24	32.72	33.41	33.88	34.43	34.41	34.41	34.40	33.60	34.23	33.05		



## Test Data in Degrees F - Test Run 7

Thermocouple No.	Elapsed Time (Minutes)																	
	10	20	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	
1	80.3	76.0	74.9	76.5	75.5	75.8	76.9	76.7	75.8	76.3	76.3	77.3	76.3	76.6	76.9	76.6	77.3	
2	78.7	75.2	74.3	75.3	73.2	73.7	76.4	77.1	74.2	74.4	74.7	76.0	73.8	74.8	76.4	75.1	76.4	
3	55.8	49.4	44.6	44.3	45.4	46.5	46.3	43.6	45.3	44.6	43.0	44.9	44.5	45.4	46.3	47.5	46.8	
3A	59.0	53.2	45.2	46.3	45.3	48.2	47.8	49.2	45.7	45.0	44.8	47.3	47.3	45.2	47.4	49.5	47.0	
4	60.5	51.8	45.6	44.4	48.5	48.4	47.1	46.6	47.2	47.9	47.8	44.2	46.4	46.3	45.8	47.6	48.5	
5	84.1	75.9	75.0	74.8	77.7	77.9	76.5	78.0	77.0	78.0	77.9	77.6	77.5	76.5	76.5	79.4		
6	58.2	50.3	45.7	46.0	46.4	47.8	48.8	48.0	47.1	46.6	46.5	46.4	46.2	46.6	47.9	48.4	49.1	
7	83.1	76.5	75.5	75.8	77.0	77.3	77.5	78.5	76.4	77.5	77.3	78.4	76.8	76.9	78.0	77.0	77.9	
8	54.5	46.9	42.7	43.0	43.2	44.0	44.4	43.6	42.8	42.1	42.5	42.7	42.8	43.6	44.8	44.9	44.6	
A1-10	75.4	69.3	67.4	67.8	68.0	68.8	69.5	69.3	68.4	68.5	68.5	69.0	68.7	69.2	69.9	70.2	69.7	
A1-11	35.9	29.5	21.8	21.4	23.6	26.5	28.9	28.0	25.3	22.8	20.9	19.2	19.0	20.9	24.9	28.7	28.4	
A1-12	45.1	38.2	33.8	34.3	35.7	38.0	38.4	37.0	36.0	34.5	34.2	33.2	33.9	35.4	37.4	39.2	39.0	
A1-13	46.9	39.6	34.3	34.7	35.9	37.1	36.7	35.5	35.6	34.8	34.8	33.8	34.7	35.4	36.1	37.5	37.6	
A1-28	50.7	43.3	37.7	37.5	40.5	43.2	43.6	42.9	41.3	39.8	38.0	36.3	35.9	37.5	41.2	43.5	44.8	
A1-30	43.5	34.6	28.2	28.2	31.1	33.9	34.6	33.7	31.9	30.3	28.6	27.7	27.1	28.8	32.4	34.8	35.9	
A1-31	36.7	29.7	22.3	22.1	24.3	26.6	27.8	27.3	24.7	23.5	21.6	21.7	20.6	22.1	25.7	27.6	28.6	
A2-10	77.1	70.7	69.1	69.3	69.7	70.3	71.1	71.2	69.9	70.3	70.2	71.1	70.8	71.1	71.6	71.9	71.2	
A2-11	60.0	54.1	51.1	51.2	51.7	53.1	54.0	53.6	52.3	51.8	50.5	51.7	51.8	52.5	53.5	54.5	53.9	
A2-12	62.0	56.8	53.7	53.8	54.0	55.3	56.0	55.2	54.3	53.9	53.6	54.0	54.7	55.1	56.2	55.8		
A2-13	60.9	53.1	49.9	50.1	51.1	51.8	51.8	51.4	50.6	50.5	50.8	51.0	51.5	52.3	52.5	52.3		
A2-28	68.0	62.0	60.0	60.1	61.0	61.9	62.0	61.7	61.1	60.9	60.8	60.6	60.8	61.4	62.1	62.5	62.4	
A2-30	64.2	57.6	55.1	55.0	56.1	57.1	57.5	57.1	56.3	55.9	55.6	55.7	56.3	57.2	57.9	57.9		
A2-31	61.4	54.1	50.9	51.2	52.3	53.5	53.6	53.0	52.0	51.6	51.7	51.5	51.7	52.2	53.5	54.1	53.9	
B1-9	67.0	60.7	58.6	58.9	59.7	60.1	60.0	59.3	59.0	59.0	59.0	58.8	59.2	59.7	60.3	60.4	60.8	
B1-10	76.1	69.7	68.2	68.2	69.0	69.5	69.6	69.0	69.3	69.6	69.4	69.2	69.0	69.2	69.9	70.8	70.2	
B1-11	37.6	32.0	28.1	29.2	30.8	32.0	31.5	29.6	28.2	26.9	26.2	25.8	26.8	29.0	30.9	31.5	32.7	
B1-12	46.1	39.7	36.2	36.7	38.4	40.1	40.3	39.3	37.7	36.7	36.2	35.9	36.2	37.5	39.4	40.6	40.6	
B1-13	49.4	41.6	37.4	37.9	38.9	39.6	39.3	38.4	37.7	37.3	37.3	37.8	38.5	39.6	39.8	40.2		
B1-14	76.6	69.7	68.1	68.3	68.8	69.1	69.3	69.0	69.0	69.3	69.4	69.5	69.6	69.7	69.8	69.8		
B1-15	54.9	47.0	42.7	43.3	44.7	45.8	45.6	44.7	43.4	42.8	42.7	42.7	43.0	44.0	45.3	46.1	46.2	
B1-16	46.2	38.9	34.6	35.3	36.7	37.5	36.7	35.9	34.9	34.6	34.1	34.3	35.1	35.9	37.1	37.8	37.7	
B1-17	54.6	47.2	44.5	44.0	44.8	45.2	45.4	44.7	44.1	43.6	44.9	43.5	44.2	44.6	46.1	45.5	47.0	
B1-18	46.5	39.2	34.2	35.0	36.8	38.1	38.0	36.9	34.9	34.0	33.7	33.4	33.8	35.4	37.0	38.6	38.7	
B1-19	57.5	49.6	46.5	47.1	47.8	48.5	48.3	47.6	47.2	46.9	47.1	47.2	47.8	48.8	49.0	49.0		
B1-20	62.6	54.7	52.3	52.6	53.1	53.7	53.3	53.0	52.8	52.8	53.1	53.1	53.4	53.6	54.1	54.3	54.2	
B1-21	-25.0	-27.2	-28.6	-25.4	-22.4	-21.5	-24.2	-28.0	-30.6	-33.2	-34.1	-33.1	-28.8	-25.2	-23.7	-23.8	-17.3	
B1-22	-56.6	-59.0	-60.0	-58.0	-55.8	-55.0	-56.5	-58.7	-60.4	-62.3	-64.1	-63.8	-61.7	-59.3	-58.3	-57.7	-53.3	
B1-23	-45.3	-48.2	-52.1	-51.1	-47.9	-42.9	-42.6	-44.6	-47.6	-50.9	-54.2	-56.8	-56.8	-53.3	-47.8	-44.6	-46.1	
B1-24	-9.6	-13.2	-18.2	-16.5	-12.0	-5.6	-7.0	-10.1	-15.0	-18.3	-20.9	-22.9	-21.7	-16.4	-9.1	-6.8	-10.2	
B1-25	6.6	2.1	-2.2	-0.9	1.5	3.2	2.9	0.5	-1.6	-3.3	-4.3	-5.3	-3.7	-1.1	1.4	2.4	3.7	
B1-26	-13.4	-16.5	-20.0	-17.2	-14.1	-11.9	-13.3	-17.1	-19.0	-22.1	-23.4	-24.1	-20.3	-16.8	-13.6	-13.0	-10.1	
B1-27	-30.9	-33.9	-36.8	-33.9	-30.3	-	-29.7	-32.9	-35.2	-38.3	-40.5	-41.2	-38.4	-33.6	-30.7	-30.1	-27.5	
B1-28	45.8	39.2	36.9	38.0	40.0	-	38.9	37.7	37.0	36.6	35.1	35.9	36.4	38.3	39.0	39.7	40.3	
B1-29	49.0	42.0	38.8	40.0	42.2	-	43.6	42.9	41.0	40.7	39.1	39.4	38.8	40.9	42.7	43.9	43.8	
B1-30	45.1	38.4	33.8	34.9	37.1	37.1	38.1	37.3	34.8	34.3	33.3	33.2	33.2	35.2	37.4	38.2	39.4	
B1-31	39.2	32.2	27.5	28.7	30.6	30.6	30.1	29.0	27.6	27.3	25.7	26.4	26.6	28.7	29.8	30.6	31.5	
B1-32	21.9	17.7	13.0	13.7	15.7	15.7	17.9	15.8	13.3	11.5	12.0	10.3	12.2	13.8	17.3	17.6	18.4	
B1-33	15.0	10.6	6.8	7.3	9.1	9.1	11.0	8.7	6.9	4.8	4.9	3.6	5.6	7.4	10.1	11.3	11.4	
B1-34	27.1	22.1	18.8	19.7	20.9	20.9	21.3	19.1	18.7	17.1	17.3	17.2	18.8	20.8	21.4	21.9	22.0	
B1-35	-9.8	-14.1	-16.5	-14.9	-13.2	-13.2	-12.5	-15.4	-16.4	-18.6	-20.0	-19.6	-18.7	-15.2	-14.1	-12.9	-11.5	
B1-36	2.3	-2.5	-7.6	-6.2	-2.2	-2.2	-3.1	0.4	-3.9	-7.2	-9.0	-10.8	-9.9	-5.4	0.9	3.4	1.0	
B1-37	29.8	23.7	19.5	20.1	22.0	22.0	24.0	23.0	20.9	19.5	18.9	18.3	18.8	20.9	23.6	24.7	23.6	
B2-10	77.4	71.2	70.0	69.9	70.3	70.3	70.8	70.8	70.8	71.0	71.1	71.1	71.1	71.4	71.7	71.1	74.4	
B2-11	52.0	45.8	43.3	43.4	44.0	44.0	43.8	43.4	43.1	42.9	42.8	42.8	43.1	43.9	44.4	44.7	44.8	
B2-12	49.0	42.8	39.9	40.3	41.1	41.1	40.6	40.0	39.5	39.2	39.0	39.2	39.3	40.5	41.3	41.3	41.6	
B2-13	57.1	49.3	46.3	47.2	48.0	48.0	47.3	46.8	46.4	46.5	46.9	47.1	47.6	48.4	49.0	48.7	48.6	
B2-28	59.9	56.7	51.7	51.3	53.9	53.9	55.1	55.2	51.0	51.7	54.2	50.6	54.9	52.7	55.9	56.0	53.3	
B2-30	53.1	46.9	44.5	44.2	44.9	44.9	45.1	44.5	44.1	43.8	44.1	43.8	44.3	45.2	45.0	46.0	45.6	
B2-31	49.9	42.5	39.1	39.4	41.1	41.1	40.7	39.7	38.7	38.5	38.5	39.0	38.8	41.1	42.0	41.8	41.4	
83	49.5	43.1	38.4	39.4	40.7	40.7	40.6	40.6	38.5	38.0	38.4	38.7	40.3	40.4	41.3	40.8		
84	53.2	46.8	42.5	42.5	43.9	43.9	45.4	45.5	43.4	43.5	43.0	42.8	42.0	43.4	44.0	45.6	45.7	
Differential Temperatures (F)																		
T2-T3	22.63	25.25	28.55	28.87	28.11	27.47	27.45	27.89	27.83	29.79	29.90	30.17	30.02	29.30	28.15	27.57	27.47	
T5-T6	23.71	26.50	29.42	29.63	29.00	28.40												



Test Data in Degrees F - Test Run 8

Thermocouple No.	Elapsed Time (Minutes)																																
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280					
1	79.1	83.6	87.4	84.4	79.7	76.8	80.2	84.4	86.9	84.3	79.3	77.2	76.9	82.5	86.9	83.9	-	77.0	78.7	83.5	86.3	84.2	80.1	76.9	77.4	82.2	86.6	84.8					
2	78.6	80.4	84.0	-	76.1	78.7	82.8	85.4	83.2	78.0	77.7	74.8	80.3	83.7	83.7	-	76.2	76.5	81.2	84.0	82.7	77.5	77.0	75.0	79.9	83.8	83.6						
3	47.8	50.5	53.3	49.9	-	48.9	47.4	45.9	54.0	57.3	56.8	55.2	53.4	55.6	51.9	53.1	-	51.3	50.6	54.1	57.5	58.3	55.1	52.8	50.3	52.8	56.3	56.3					
3A	46.7	48.9	52.1	55.4	-	50.5	49.1	51.1	55.1	57.0	56.5	55.1	53.2	53.1	54.1	53.7	51.8	-	52.1	50.8	51.5	55.9	54.7	51.3	51.7	52.8	57.2	57.2					
4	46.7	51.8	53.3	57.1	-	50.5	47.3	52.6	53.7	55.2	57.8	54.1	55.9	53.1	54.1	53.7	51.8	-	51.9	53.6	53.2	59.0	58.0	58.8	52.9	52.8	55.0	56.4					
5	79.1	83.4	87.9	86.7	80.2	86.0	88.1	83.4	79.9	76.6	81.2	88.5	83.1	86.5	86.5	87.0	80.9	82.4	88.3	84.0	82.6	77.9	78.8	84.1	87.9	86.6	86.6						
6	49.5	53.4	59.0	60.6	59.1	56.9	55.0	59.3	61.2	56.6	56.2	56.5	56.2	56.5	53.5	50.3	50.6	54.9	59.1	56.0	54.9	58.6	56.2	56.9	56.0	56.7	61.7	61.7					
7	80.2	83.4	87.0	85.4	80.9	86.0	87.8	77.9	84.4	87.8	82.4	87.4	84.7	83.0	83.3	83.0	82.4	87.4	84.3	83.0	82.4	87.2	84.4	81.3	78.1	77.8	80.4	86.3	85.0				
8	44.9	45.5	47.6	46.1	45.0	40.9	42.4	43.9	49.0	52.7	52.3	50.0	45.8	47.8	49.4	51.2	51.3	51.2	49.2	50.2	53.3	50.8	52.3	47.0	43.4	44.2	45.8	49.9	49.9				
A1-10	70.5	75.2	79.7	78.3	75.2	71.5	76.3	74.7	79.5	79.1	74.8	73.9	71.1	74.8	72.0	76.5	75.8	73.3	70.7	76.5	78.3	80.1	80.1	75.6	72.7	71.2	73.8	78.1	78.1				
A1-11	32.2	40.1	45.9	47.3	43.3	42.1	44.5	45.7	49.7	50.7	49.2	50.2	49.0	41.7	36.1	36.0	32.2	31.8	33.7	43.6	47.0	51.6	53.6	49.9	46.7	46.0	47.6	50.9	50.9				
A1-12	40.9	47.5	52.2	52.0	50.4	47.3	53.5	54.5	52.1	52.1	44.6	42.6	43.7	40.5	41.2	40.9	42.8	48.4	48.4	47.6	49.5	49.1	51.7	52.2	49.5	49.1	49.8	50.9					
A1-13	40.0	44.9	49.8	51.9	50.9	51.8	56.9	55.7	54.3	54.3	59.0	56.0	56.2	56.5	56.2	56.5	56.3	56.3	56.3	56.3	56.3	56.3	56.3	56.3	56.3	56.3	56.3	56.3					
A1-18	57.0	53.6	59.1	58.1	56.7	54.3	53.7	53.7	53.7	53.7	61.0	60.0	61.0	59.3	59.3	59.3	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7					
A1-30	38.4	51.2	51.5	51.8	50.0	47.6	51.9	53.5	54.6	51.3	44.3	44.3	44.3	44.3	44.3	44.3	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4					
A1-31	31.5	37.0	42.5	44.3	40.8	40.5	45.0	45.3	43.4	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3				
A2-10	71.9	76.8	81.2	79.2	76.4	72.5	73.1	77.7	80.5	80.4	75.9	74.4	72.8	76.1	78.8	78.2	75.3	72.1	72.0	77.1	80.5	81.0	76.1	73.5	72.3	75.1	79.6	79.6					
A2-11	56.0	65.5	69.0	64.9	63.5	61.1	60.5	65.4	66.8	67.0	64.5	63.4	62.5	66.0	65.9	65.9	55.7	55.7	55.7	55.7	62.4	65.4	63.1	62.1	63.2	66.7	67.6						
A2-12	57.1	62.8	67.7	67.2	65.6	63.5	63.5	63.5	63.5	63.5	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0						
A2-13	53.2	57.8	62.7	63.4	61.9	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4					
A2-18	63.6	67.8	73.1	71.9	69.3	66.4	67.2	71.2	71.7	71.1	67.4	67.4	67.5	65.8	65.8	65.8	64.9	64.7	64.7	64.7	64.7	64.7	64.7	64.7	64.7	64.7	64.7	64.7					
A2-20	55.8	63.4	69.3	68.7	66.6	64.3	63.0	64.3	64.3	64.3	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4					
A2-31	50.2	55.0	60.1	65.4	64.4	62.4	60.8	62.9	65.9	66.4	63.0	61.8	60.1	58.1	59.3	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7				
B1-9	61.3	63.7	66.6	65.1	61.2	57.6	58.5	63.1	67.6	68.5	67.0	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1				
B1-10	70.8	74.4	78.3	76.0	72.7	69.3	69.6	74.5	78.0	77.0	74.7	71.5	71.5	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4				
B1-11	33.2	32.2	31.6	29.8	25.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7				
B1-12	41.0	43.6	47.7	41.8	37.2	32.8	31.3	37.3	45.0	47.7	50.7	48.5	45.7	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0				
B1-13	40.0	41.9	42.4	39.7	35.9	34.9	38.6	44.0	48.5	49.9	47.2	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3				
B1-14	70.1	74.1	78.1	77.1	72.8	69.5	69.7	74.7	74.7	73.3	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6	74.6				
B1-15	46.1	47.6	48.5	48.1	44.5	40.3	38.4	43.5	49.7	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5				
B1-16	37.8	38.3	39.1	38.9	36.9	33.2	32.2	31.8	35.6	35.2	32.2	31.8	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2				
B1-17	46.7	49.4	48.6	48.6	46.9	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1				
B1-18	38.8	39.4	39.1	38.4	34.5	30.1	27.6	30.8	34.5	34.3	31.2	31.0	28.2	31.0	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2				
B1-19	49.0	50.9	52.7	52.7	49.8	45.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8				
B1-20	54.6	56.6	59.4	59.5	56.2	52.6	56.7	60.7	62.3	61.2	59.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7				
B1-21	-18.7	-25.3	-32.2	-37.4	-41.1	-40.5	-31.9	-20.5	-19.4	-19.6	-22.4	-26.3	-28.5	-29.4	-15.6	-3.9	-10.2	-10.9	-1.3	-9.2	-17.0	-22.9	-28.0	-31.1	-25.9	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4		
B1-22	-22.9	-27.0	-33.0	-39.1	-43.4	-48.0	-46.0	-41.3	-32.1	-20.5	-11.9	-17.9	-21.9	-24.4	-26.3	-28.5	-29.4	-15.6	-3.9	-10.2	-10.9	-1.3	-9.2	-17.0	-22.9	-28.0	-31.1	-25.9	-18.4	-18.4	-18.4	-18.4	-18.4
B1-23	41.0	41.3	42.2	42.2	39.6	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9				
B1-24	-39.7	-37.1	-41.7	-41.8	-41.8	-40.6	-36.0	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4			
B1-25	5.3	11.8	-1.7	-22.6	-27.3	-23.4	-13.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7		
B1-26	-7.2	-17.4	-24.2	-30.8	-34.3	-42.1	-47.4	-52.7	-57.4	-62.1	-67.4	-72.2	-75.4	-79.2	-81.6	-84.7	-87.8	-90.4	-93.4	-96.4	-99.0	-10.9	-1.3	-9.2	-17.0	-22.9	-28.0	-31.1	-25.9	-18.4	-18.4	-18.4	-18.4
B1-27	-22.8	-22.0	-21.4	-19.8	-17.3	-14.1	-15.2	-20.5	-21.6	-22.2	-20.0	-16.5	-15.3	-13.1	-10.9	-8.7	-6.5	-3.9	-1.3	-9.2	-17.0	-22.9	-28.0	-31.1	-25.9	-18.4	-18.4	-18.4	-18.4	-18.4			
B1-28	-9.5	-14.9	-17.7	-20.6	-23.5	-25.4	-22.0	-17.																									



## Test Data in Degrees F - Test Run 8 (Cont)

Thermal Upd. N.s.	Elapsed Time (Minutes)												Elapsed Time (Minutes)																
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	
Differential Temperatures (F)																													
T2-T3	28, 21	30, 28	31, 02	27, 10	25, 40	24, 22	30, 28	31, 19	29, 00	24, 78	24, 13	30, 64	27, 24	27, 51	31, 97	28, 39	26, 37	24, 30	26, 26	27, 10	26, 90	24, 26	22, 09	22, 26	25, 04	29, 02	30, 50	25, 32	
T5-T6	28, 83	29, 54	28, 10	25, 82	24, 40	23, 10	20, 60	25, 51	27, 18	26, 50	21, 35	21, 19	27, 48	33, 30	29, 54	27, 91	26, 63	28, 13	27, 55	26, 90	24, 65	21, 41	20, 08	21, 47	24, 76	26, 60	23, 08	23, 08	23, 08
T7-T8	33, 37	34, 80	35, 99	35, 80	34, 60	35, 55	36, 50	35, 50	35, 50	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	35, 48	
Flow Distribution (Thousands per Hour)																													
W1	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200		
W2	163	188	196	186	182	180	183	188	189	191	186	180	178	183	182	187	-	183	181	189	190	186	181	182	183	186	190		
W5	93	96	103	97	98	99	96	102	102	95	87	91	95	97	99	92	88	93	100	100	98	100	102	102	102	101	96		
W7	104	101	105	103	95	101	98	101	103	104	106	102	102	104	102	108	102	107	106	104	101	102	104	101	100	102	101		
Pressures (Pounds per Square Inch)																													
P2-P3	1, 34	1, 34	1, 20	1, 20	1, 27	1, 33	1, 31	1, 31	1, 31	1, 17	1, 17	1, 23	1, 23	1, 25	1, 25	1, 21	1, 24	1, 25	1, 29	1, 25	1, 18	1, 18	1, 19	1, 25	1, 30	1, 25	1, 19	1, 20	



## Test Data in Degrees F - Test Run 8 (Cont)

Thermocouple No.	Elapsed Time (Minutes)																											
	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540		
1	80.5	76.3	76.9	84.1	85.3	83.5	77.9	75.9	78.2	80.8	82.4	85.8	80.4	76.4	78.6	81.6	86.7	85.3	80.4	77.9	76.9	79.4	86.2	85.5	78.7	77.2	76.8	
2	81.5	74.3	76.4	81.4	84.0	82.9	77.1	75.1	76.5	80.1	81.9	80.0	75.4	76.9	78.5	85.3	84.6	80.1	78.3	75.7	78.4	82.9	84.6	79.9	76.8	79.7		
3	55.5	54.5	50.9	49.9	53.3	54.1	52.7	49.9	48.7	51.6	54.2	57.9	56.2	53.5	49.0	49.5	56.0	56.0	56.0	56.7	53.3	52.3	53.5	56.2	53.8	51.4	54.3	
3A	57.8	56.1	53.1	52.1	55.1	56.0	54.3	51.3	51.5	52.6	53.2	57.3	59.9	55.4	59.2	54.2	54.2	54.2	54.2	54.2	54.4	51.7	51.8	55.4	56.7	56.7	54.3	54.3
4	57.3	58.1	53.2	51.2	54.6	54.3	54.6	51.0	50.6	52.6	54.6	51.0	52.6	51.6	58.1	55.3	51.6	52.0	54.5	59.3	56.0	57.2	51.8	55.4	56.2	58.8	52.2	52.2
5	81.9	79.0	76.4	85.3	86.4	85.3	79.0	75.2	80.3	79.4	79.9	85.1	79.6	76.8	80.8	83.3	84.1	84.6	83.1	77.9	79.2	77.9	86.2	85.9	81.0	76.4	76.4	
5A	51.4	59.3	57.3	61.7	62.6	59.6	55.4	55.0	53.3	60.2	61.2	54.0	50.4	52.3	55.4	54.2	53.3	54.0	54.6	54.6	54.6	56.0	60.2	60.9	59.2	58.2	58.2	58.2
6	82.4	77.0	77.5	84.9	86.5	85.3	79.0	76.0	79.8	80.6	82.2	80.6	80.8	80.8	80.6	80.6	82.1	85.6	86.3	82.0	78.9	78.4	82.0	85.7	86.1	80.4	77.7	
7	81.7	74.7	43.5	42.2	44.8	45.3	44.1	42.3	42.6	47.0	51.0	54.5	53.4	49.6	46.8	46.9	50.8	54.6	54.5	53.0	48.9	46.7	48.0	50.3	48.1	44.9	44.9	44.9
8	76.2	72.2	71.4	75.4	78.4	78.1	74.1	70.9	74.2	75.6	80.0	75.3	70.1	70.3	71.9	76.8	76.4	75.7	75.7	75.7	75.7	72.0	72.5	72.5	72.5	72.5	72.5	72.5
A1-10	54.3	52.8	50.6	50.8	52.2	51.1	47.6	43.8	42.8	43.4	46.6	53.0	52.6	44.6	38.2	36.1	36.0	39.2	42.7	43.9	42.8	48.5	52.5	53.2	49.4	49.5	49.5	49.5
A1-11	56.2	53.7	50.9	51.7	54.1	53.4	50.8	47.8	47.5	48.2	50.4	56.1	52.7	45.2	40.7	40.7	43.1	47.9	50.7	51.4	47.7	50.6	52.5	55.0	52.4	49.3	49.3	
A1-12	51.4	50.2	46.4	47.5	51.9	52.4	50.4	44.5	44.2	44.9	44.5	48.3	47.1	43.6	40.7	40.7	43.1	47.9	50.7	51.4	47.7	50.6	52.5	55.0	52.4	49.3	49.3	
A1-13	64.4	62.2	60.0	62.2	63.2	62.3	58.2	54.0	54.7	55.0	58.5	64.5	62.4	56.1	51.8	51.0	51.3	53.7	55.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7
A1-28	62.0	59.6	57.3	63.7	64.7	61.7	61.0	61.7	61.0	61.7	64.9	65.6	61.0	56.6	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
A1-30	57.9	54.9	52.3	53.6	55.6	54.8	50.7	46.5	47.5	49.5	56.6	54.2	46.5	41.6	40.4	40.7	45.1	49.2	49.9	46.9	46.9	50.4	54.6	55.3	52.9	48.8	48.8	
A1-31	49.8	48.2	45.9	46.1	49.1	48.8	44.9	41.3	40.9	40.5	44.7	46.1	41.1	34.9	32.4	32.6	36.2	42.1	42.3	38.8	41.1	41.1	47.9	47.9	44.4	44.4	44.4	44.4
A2-10	77.0	72.8	72.5	76.6	79.8	79.5	75.3	71.7	73.3	75.2	76.4	81.2	76.3	70.4	72.1	74.1	78.1	80.0	77.0	76.4	77.0	73.2	77.0	80.9	75.6	75.6	75.6	
A2-11	66.8	64.8	63.4	64.3	67.9	67.8	64.5	61.5	62.0	63.5	63.1	68.6	66.7	58.8	56.0	56.8	59.5	62.6	62.8	67.3	62.7	66.8	64.1	64.1	64.1	64.1	64.1	64.1
A2-12	68.6	65.5	67.5	67.1	70.4	70.3	67.3	64.1	63.6	64.9	65.6	70.1	69.4	61.9	59.1	58.7	64.4	67.1	69.5	66.3	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1
A2-13	62.0	59.6	57.3	63.7	64.7	61.7	61.0	57.3	56.6	56.6	56.6	61.8	61.0	54.0	51.0	53.1	55.8	60.0	61.1	61.5	55.4	56.1	62.3	63.0	60.0	60.0	60.0	60.0
A2-28	72.4	69.7	68.4	71.4	73.9	73.5	70.0	66.5	67.4	69.0	70.1	74.5	72.0	66.0	64.7	66.2	68.5	70.5	70.5	68.8	67.2	70.1	72.8	75.4	75.4	75.4	75.4	75.4
A2-30	69.7	65.7	67.6	71.2	71.2	67.8	64.0	67.7	62.1	67.8	64.0	66.2	61.7	59.6	61.3	63.3	66.5	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0
A2-31	66.7	64.4	65.7	67.4	67.4	62.3	62.9	67.7	68.0	65.1	61.1	60.5	61.1	60.7	66.3	66.6	57.8	54.1	55.6	61.8	63.0	65.4	59.7	66.4	64.0	64.0	64.0	
B1-9	65.9	61.9	59.1	61.9	63.3	61.0	61.0	58.7	60.3	63.8	67.0	69.8	66.4	62.8	62.8	64.1	64.1	68.8	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0
B1-10	74.6	-	69.0	73.4	75.6	72.6	68.8	69.7	75.6	78.3	78.3	72.5	75.0	70.9	70.8	74.2	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9	76.9
B1-11	40.8	30.7	27.6	26.4	24.5	26.3	29.7	37.0	42.0	44.9	42.8	38.1	35.1	38.1	35.1	38.1	35.4	36.1	41.2	46.0	48.6	41.2	41.2	41.2	36.8	36.8	36.8	
B1-12	48.9	39.6	37.5	36.8	34.6	34.6	35.1	38.6	38.4	39.1	38.6	38.6	37.8	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6
B1-13	47.6	42.6	37.9	36.0	38.4	39.1	38.6	37.8	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6
B1-14	74.3	70.4	68.6	72.5	76.0	75.9	72.9	68.9	69.7	72.3	74.5	78.3	74.3	70.5	70.4	72.6	76.6	79.1	75.5	72.5	70.3	71.1	74.4	78.6	73.2	69.9	69.9	69.9
B1-15	54.7	49.4	44.3	41.7	43.6	43.8	43.8	43.8	43.8	43.8	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4
B1-16	45.3	40.6	36.1	33.9	35.7	35.7	34.9	34.4	34.2	34.6	36.2	36.0	36.0	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
B1-17	52.5	48.3	43.0	43.1	46.6	47.5	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4
B1-18	47.9	43.0	37.6	32.8	31.8	31.9	32.1	32.8	32.1	32.8	32.0	32.8	32.0	32.8	32.0	32.8	32.0	32.8	32.0	32.8	32.0	32.8	32.0	32.8	32.0	32.8	32.0	32.8
B1-19	56.2	51.1	46.8	46.5	49.8	50.0	48.8	47.1	47.7	48.7	50.7	54.0	52.9	50.3	51.2	54.4	58.8	57.7	54.5	51.5	50.0	51.3	54.8	52.5	48.4	48.4	48.4	48.4
B1-20	60.3	55.2	51.9	53.3	57.3	57.6	56.1	53.1	53.4	56.3	59.5	63.0	60.8	56.6	54.8	56.5	60.0	63.7	61.5	58.3	55.0	56.7	59.6	60.9	57.6	54.1	54.1	54.1
B1-21	-7.0	-14.6	-23.6	-22.7	-22.7	-22.7	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6	-23.6
B1-22	-10.9	-15.2	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9
B1-23	-47.3	-42.4	39.1	38.4	38.3	37.1	36.0	36.0	35.9	35.9	34.9	44.9	49.0	51.2	48.0	44.7	42.5	44.8	49.3	53.0	53.5	53.0	53					



## Test Data in Degrees F - Test Run 8 (Cont)

		Elapsed Time (Minutes)												
		200	300	400	500	600	700	800	900	1000	1100	1200		
		Differential Temperatures (F)												
T2-T3	20.86	19.85	23.46	30.98	28.86	26.91	24.41	24.48	26.28	26.09	25.624.44	20.06	22.19	
T5-T6	19.17	17.10	19.82	26.02	23.31	21.38	19.27	20.46	23.25	24.63	26.6725.00	19.91	23.05	22.57
T7-T8	28.24	28.64	32.90	39.89	39.26	37.94	33.96	32.56	34.02	33.04	31.0330.97	26.64	27.10	31.02
		Flow Distr. Rates (Pounds per Hour)												
W1	200	200	200	200	200	200	200	200	200	200	200	200	200	
W2	189	179	184	193	186	189	180	181	183	186	185	188	181	
W5	96	92	97	100	103	104	95	91	90	97	96	95	93	
W7	103	94	102	103	100	95	100	99	97	102	101	103	102	
		Forces (Pounds per Square Inch)												
P2-P3	1.24	1.30	1.30	1.22	1.20	1.24	1.30	1.30	1.25	1.16	1.15	1.22	1.20	



## Test Data in Degrees F - Test Run 9

Thermo-couple No.	Elapsed Time (Minutes)					Thermo-couple No.	Elapsed Time (Minutes)				
	30	60	90	110	120		30	60	90	110	120
1	70.9	71.6	67.3	70.9	71.2	B1-25	-32.4	-33.4	-32.8	-32.9	-33.0
2	68.7	69.9	70.8	70.8	70.3	B1-26	-38.6	-42.7	-43.6	-43.9	-44.5
3	27.4	34.4	36.9	37.3	35.4	B1-27	-43.0	-49.3	-52.0	-53.4	-52.9
3A	29.1	39.0	42.0	40.2	42.0	B1-28	-46.6	-62.6	-67.4	-69.5	-69.3
4	47.1	47.8	46.2	46.1	47.4	B1-29	28.5	32.3	33.8	33.2	33.8
5	73.8	74.3	72.6	70.7	73.5	B1-30	10.3	17.8	21.1	20.9	21.0
6	34.4	40.2	41.1	40.7	41.7	B1-31	-36.5	-47.8	-49.4	-50.3	-50.3
7	74.3	73.5	72.8	71.7	73.2	B1-32	-23.1	-20.7	-19.5	-18.9	-20.2
8	21.0	30.1	33.3	33.2	33.2	B1-33	-26.8	-26.1	-25.2	-25.0	-25.6
A1-10	59.0	61.9	62.3	62.5	62.2	B1-34	-9.9	-15.7	-17.2	-17.6	-18.1
A1-11	-23.2	-21.3	-17.7	-16.7	-17.3	B1-35	-53.2	-68.2	-73.7	-76.1	-76.4
A1-12	4.5	10.5	15.5	16.7	16.4	B1-36	-15.0	-12.3	-11.5	-11.4	-11.5
A1-13	-5.1	-2.3	3.1	4.4	4.3	B1-37	11.3	14.6	15.0	14.9	14.9
A1-28	-37.9	-50.5	-53.5	-54.4	-54.0	B2-10	63.6	65.6	65.3	65.2	65.4
A1-30	1.8	9.2	14.5	14.8	15.5	B2-11	27.4	34.3	36.2	36.4	36.5
A1-31	-33.6	-41.7	-42.1	-42.6	-41.9	B2-12	15.7	26.9	31.1	31.1	31.6
A2-10	63.6	65.8	65.5	65.2	65.4	B2-13	30.3	38.6	40.0	40.1	40.1
A2-11	42.2	46.7	47.2	47.4	47.1	B2-28	32.8	44.3	45.9	46.5	44.1
A2-12	45.3	49.4	50.2	50.6	49.9	B2-30	24.9	34.4	36.6	37.0	36.7
A2-13	37.0	43.7	44.8	44.8	44.8	B2-31	17.6	28.6	31.5	31.9	31.8
A2-28	53.6	56.3	56.5	56.3	56.3	83	18.1	27.3	30.6	30.8	30.1
A2-30	46.2	50.6	51.0	51.0	51.0	84	31.5	37.7	38.4	38.4	37.6
A2-31	41.7	46.8	47.4	47.2	47.2	Differential Temperatures (F)					
B1-9	2.1	-10.5	-13.1	-14.2	-14.9	T2-T3	38.30	34.41	31.23	31.22	31.15
B1-10	60.9	63.2	63.0	63.0	63.2	T5-T6	35.04	32.35	30.02	29.98	29.96
B1-11	-18.4	-15.1	-13.0	-12.6	-12.7	T7-T8	46.72	41.06	37.43	37.35	37.33
B1-12	12.3	18.1	20.9	21.0	21.0	Flow Distribution (Pounds per Hour)					
B1-13	1.9	4.6	7.9	8.0	7.9	W1	200	200	200	200	200
B1-14	60.2	53.1	63.1	63.0	63.1	W2	110	128	133	133	132
B1-15	2.9	3.7	6.7	6.7	6.4	W5	66	74	78	74	76
B1-16	-3.2	-5.2	-5.3	-5.9	-5.8	W7	66	71	76	76	76
B1-17	11.8	24.2	26.3	24.2	26.4	Pressures (Pounds per Square Inch)					
B1-18	-11.9	-12.6	-10.6	-10.5	-10.8	P2-P3	1.06	1.20	1.24	1.23	1.23
B1-19	20.9	25.4	28.2	28.2	28.2						
B1-20	35.2	41.5	43.0	42.9	43.0						
B1-21	-42.4	-47.6	-50.8	-52.3	-52.8						
B1-22	-63.1	-69.9	-76.0	-79.4	-80.8						
B1-23	-52.6	-54.2	-54.9	-55.6	-55.6						
B1-24	-24.9	-23.4	-22.6	-22.5	-22.6						

## Test Data in Degrees F - Test Run 10



Thermocouple No.	Elapsed Time (Minutes)										Elapsed Time (Minutes)										
	20	40	60	80	90	110	130	150	170	180	20	40	60	80	90	110	130	150	170	180	
1	77.7	81.2	81.1	98.2	100.6	102.1	102.2	103.9	105.2	103.9	31.23	56.1	56.2	56.2	55.7	55.4	54.7	54.2	53.6	53.5	
2	76.8	81.4	89.3	96.2	97.1	100.9	98.6	100.4	102.1	B1-24	-22.6	-21.8	-20.1	-18.1	-17.0	-14.9	-13.4	-12.8	-12.1	-11.9	
3	86.8	41.0	56.0	60.9	63.5	66.8	66.7	68.2	67.9	B1-25	-21.2	-20.0	-19.7	-18.7	-17.6	-17.0	-16.5	-16.2	-15.9	-15.6	
4	42.5	49.1	61.4	64.1	63.1	67.7	66.7	65.5	67.5	B1-26	-45.1	-44.1	-41.1	-39.4	-37.9	-36.1	-33.8	-32.9	-33.1	-33.1	
5	46.3	48.8	54.1	58.7	63.9	64.7	67.7	65.5	67.2	B1-27	-54.5	-54.5	-54.6	-53.5	-52.3	-51.4	-49.7	-49.0	-49.3	-49.3	
6	77.6	85.4	88.8	97.3	102.2	102.4	102.2	102.1	102.1	B1-28	-71.1	-69.6	-67.1	-65.3	-62.8	-60.8	-58.0	-57.5	-57.5	-57.5	
7	42.9	52.8	57.2	62.1	65.2	67.7	69.4	67.6	68.1	B1-29	36.3	44.2	49.8	54.9	59.5	59.1	59.8	60.0	60.2	60.0	
8	78.0	85.0	90.7	97.7	101.1	102.8	102.7	102.9	102.4	B1-30	23.3	36.2	43.6	48.2	50.0	52.7	52.3	53.3	53.5	53.8	
9	35.4	46.5	53.7	58.7	60.7	64.3	64.0	64.8	65.4	B1-31	-51.4	-49.9	-44.3	-37.2	-33.3	-33.3	-33.3	-33.3	-33.3	-33.3	
A1-10	66.7	73.5	80.6	86.6	89.6	92.2	91.6	92.1	93.0	B1-32	-19.1	-14.7	-8.6	-4.9	-3.8	-1.2	0	0	1.6	2.0	
A1-11	-15.7	-11.1	-4.2	0.1	1.6	4.5	4.7	5.1	5.0	B1-33	-25.1	-21.2	-15.9	-12.5	-10.9	-8.5	-6.6	-6.7	-5.6	-5.6	
A1-12	18.8	31.1	59.2	64.5	71.1	50.4	51.2	52.7	52.6	B1-34	-18.4	-15.8	-11.2	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	
A1-13	4.7	15.0	26.5	32.6	35.7	40.4	42.3	42.9	44.3	B1-35	-78.3	-79.0	-79.4	-79.4	-79.4	-75.6	-73.6	-71.6	-71.9	-71.9	
A1-14	-54.8	-54.0	-51.4	-47.3	-44.8	-41.3	-36.6	-33.7	-31.4	B1-36	-11.1	-8.6	-5.2	-2.6	-1.3	1.0	1.0	1.9	3.1	3.3	
A1-15	17.2	30.6	39.2	53.3	53.4	53.3	54.2	54.2	54.2	B1-37	16.2	20.2	24.4	28.5	30.4	33.1	33.9	33.9	34.8	34.8	
A1-16	-42.3	-40.7	-34.7	-28.9	-26.7	-21.9	-18.5	-15.6	-14.8	B2-10	69.7	76.6	83.0	89.4	92.6	94.8	94.8	94.5	95.9	95.8	
A2-10	70.0	76.5	83.2	89.7	92.2	94.9	94.0	94.7	95.2	B2-11	39.6	49.3	54.8	60.1	62.5	65.1	65.4	66.3	66.3	66.3	
A2-11	50.3	57.7	63.5	68.4	73.1	73.1	73.1	73.1	73.1	B2-12	34.3	46.3	52.6	57.9	60.4	63.1	63.3	64.1	64.1	64.1	
A2-12	53.1	60.0	66.0	70.8	72.7	75.5	75.4	76.9	76.9	B2-13	42.6	52.8	59.0	64.1	66.6	69.4	69.3	70.1	70.1	70.1	
A2-13	47.1	56.3	62.4	67.2	69.7	72.5	72.3	73.1	73.1	B2-28	49.4	58.1	65.7	70.2	71.9	74.1	75.1	76.3	77.9	78.7	
A2-14	60.1	67.3	73.2	78.7	81.3	83.4	83.4	83.5	84.6	B2-30	40.1	51.7	57.9	63.2	65.8	68.4	68.4	69.9	70.0	70.0	
A2-30	54.3	63.8	69.8	74.9	79.5	79.5	79.6	79.6	80.5	B2-31	33.9	45.2	51.8	56.6	59.0	62.1	62.0	63.1	63.1	63.1	
A2-31	49.4	57.6	63.2	67.7	70.0	72.5	72.5	73.5	73.5	B2-32	83	33.1	44.2	50.9	55.4	57.9	60.5	61.4	62.2	62.2	
B1-9	-15.6	-12.2	-5.6	0.	2.7	7.7	11.3	14.0	15.9	B1-10	84	40.9	49.9	56.0	60.6	63.1	66.3	67.4	67.6	67.6	
B1-10	67.2	74.6	80.9	87.3	90.6	92.7	93.1	92.5	94.0	B1-11	10.0	10.1	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
B1-11	-11.9	-5.9	0.6	4.5	6.3	8.8	9.8	9.5	9.5	B1-12	52.3	34.61	31.26	31.35	33.47	33.91	32.30	32.27	32.13	32.51	32.00
B1-12	22.8	34.1	40.9	45.7	47.6	50.5	51.2	52.0	52.3	B1-13	138	187	187	188	190	190	188	190	190	190	189
B1-13	8.2	18.9	29.1	35.0	37.7	41.9	43.6	44.3	45.3	B1-14	73	100	97	97	95	96	97	95	97	95	99
B1-14	67.0	74.4	81.1	87.4	90.6	92.9	92.7	93.9	93.9	B1-15	81	105	104	101	104	104	105	107	107	102	102
B1-15	6.5	13.7	25.5	32.0	34.8	40.2	42.4	43.9	45.6	B1-16	21.6	-	-	-	-	-	-	-	-	-	-
B1-16	-5.1	-0.3	5.8	10.7	13.2	17.0	18.8	20.0	21.1	B1-17	60.6	W1	200	200	200	200	200	200	200	200	200
B1-17	28.7	37.6	47.6	52.7	54.7	57.8	59.0	59.5	61.4	B1-18	138	138	187	187	188	188	188	188	188	188	189
B1-18	-10.9	-6.0	3.5	9.4	11.8	16.3	18.7	20.5	21.1	B1-19	73	100	97	97	95	96	97	95	97	95	99
B1-19	28.0	39.8	48.9	54.7	57.5	61.3	62.3	62.5	63.8	B1-20	81	105	104	101	104	104	105	107	107	107	102
B1-20	45.5	55.6	62.8	68.5	71.2	74.2	74.3	75.2	75.3	B1-21	-	-	-	-	-	-	-	-	-	-	-
B1-21	-53.6	-54.1	-53.2	-51.7	-51.0	-49.3	-47.4	-46.5	-45.2	B1-22	-87.8	-88.0	-88.2	-88.3	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8	-87.8
B1-22	-83.5	-85.1	-86.7	-87.7	-87.7	-87.7	-87.7	-87.7	-87.7	B1-23	P2	40.00	-	-	-	-	-	-	-	-	-
B1-23	-	-	-	-	-	-	-	-	-	B1-24	P3	39.00	-	-	-	-	-	-	-	-	-
B1-24	-	-	-	-	-	-	-	-	-	B1-25	P2-P3	1.18	1.30	1.18	1.07	1.05	1.03	1.01	1.01	1.01	1.00



## Test Data in Degrees F - Test Runs 11 Through 20

Thermo-couple No.	Elapsed Time (Minutes)													
	Run 11			Run 12		Run 13		Run 14		Run 19		Run 20		
	20	40	60	10	20	10	20	20	40	60	20	30	11	30
1	95.6	98.2	98.3	97.9	98.1	97.8	98.4	98.1	98.2	97.9	97.7	97.9	98.3	97.8
2	92.8	96.4	95.9	94.4	96.5	96.6	94.9	94.3	95.9	95.8	94.2	94.1	96.6	94.4
3	63.1	63.4	64.9	71.5	69.7	70.4	71.0	62.2	61.4	63.0	63.4	63.4	65.1	65.1
3A	61.8	62.2	64.2	71.1	69.2	66.4	71.2	60.5	64.0	64.3	62.9	62.5	63.7	66.1
4	64.5	62.9	61.8	70.8	69.0	65.5	72.3	63.6	61.9	62.9	64.1	64.1	61.3	67.2
5	95.2	98.1	97.4	98.1	97.2	96.4	101.0	96.2	98.6	99.4	99.3	99.7	97.3	100.0
6	60.9	64.2	64.3	73.0	70.9	70.9	70.8	63.4	64.0	64.5	64.3	64.4	64.1	67.8
7	95.7	98.4	98.2	97.1	97.7	97.5	99.1	97.5	98.8	99.1	98.3	98.6	97.9	98.7
8	59.8	61.0	61.1	68.1	66.7	70.0	70.1	59.5	60.7	60.8	60.4	61.1	63.4	63.4
A1-10	86.4	88.2	88.4	89.0	89.0	41.0	29.7	87.4	88.1	88.1	87.5	87.6	88.4	88.3
A1-11	2.0	1.6	1.8	-5.0	-8.9	3.0	7.3	-0.3	0.7	0.8	0.9	1.2	1.3	
A1-12	48.3	48.2	48.7	59.1	58.5	10.1	11.0	47.2	47.9	48.1	48.4	48.4	48.6	53.2
A1-13	42.2	41.0	41.5	40.2	27.9	31.8	42.6	44.3	42.8	42.8	43.0	42.8	42.4	50.0
A1-28	-26.6	-26.4	-26.2	-14.8	-6.9	-30.1	-28.4	-12.9	-16.2	-17.8	-18.6	-19.0	-19.7	-9.3
A1-30	47.8	48.6	48.8	59.3	58.4	51.2	54.1	44.5	47.2	48.1	48.2	48.2	47.9	54.5
A1-31	-12.0	-11.8	-11.8	-8.9	-6.1	2.8	19.0	-3.8	-4.9	-6.1	-7.4	-7.4	-7.6	0.6
A2-10	88.4	90.7	90.7	90.9	91.2	43.3	33.7	89.6	90.8	90.7	89.8	90.1	90.6	90.7
A2-11	68.9	70.1	70.2	73.6	73.3	53.8	48.4	67.9	69.1	69.4	69.3	69.1	69.6	71.4
A2-12	72.0	72.6	72.9	77.0	77.2	55.4	49.9	71.2	71.8	72.2	72.0	72.0	72.5	74.3
A2-13	68.0	68.8	69.0	64.5	56.8	61.7	64.1	68.7	68.7	68.9	68.8	68.9	71.6	
A2-28	79.0	80.1	80.1	83.3	83.5	44.2	35.7	79.5	79.8	80.1	80.1	80.1	81.7	
A2-30	75.4	76.4	76.5	82.5	82.4	70.7	56.2	75.1	75.7	76.1	75.9	75.9	76.1	78.3
A2-31	68.6	69.4	69.5	66.5	64.8	70.1	66.6	68.6	69.0	69.3	69.3	69.2	69.3	71.9
B1-9	17.6	16.9	17.0	26.3	21.4	1.2	4.6	22.9	19.7	18.7	18.3	18.2	18.1	15.7
B1-10	87.7	88.5	88.7	90.4	89.6	41.5	32.0	88.8	88.5	88.8	89.0	88.9	88.7	88.4
B1-11	7.8	7.1	7.3	5.7	3.8	-5.4	-6.5	4.6	6.3	6.8	7.0	6.8	7.1	3.2
B1-12	48.3	48.8	49.0	60.5	60.5	3.7	-1.5	47.1	48.6	48.8	48.7	48.5	48.9	56.7
B1-13	43.0	42.6	42.9	40.6	27.0	22.9	36.3	44.8	43.7	43.5	43.4	43.3	43.4	16.9
B1-14	87.3	88.8	88.8	60.9	52.5	88.5	87.8	88.8	88.8	88.8	88.7	88.8	88.8	50.5
B1-15	43.8	43.0	43.1	25.1	14.8	55.0	62.9	44.7	44.4	44.0	43.7	43.7	43.5	10.4
B1-16	20.2	20.0	19.9	26.2	18.3	24.8	34.0	22.5	21.4	21.0	20.7	20.7	20.2	14.2
B1-17	56.4	56.5	56.8	30.5	20.7	66.3	69.1	58.3	56.8	56.9	56.3	56.3	57.2	15.7
B1-18	21.1	20.2	20.2	6.7	-0.3	21.1	31.3	20.5	21.2	21.0	20.6	20.7	20.6	-2.6
B1-19	59.8	59.9	60.2	55.0	43.2	43.1	52.3	61.1	60.6	60.5	60.4	60.4	34.8	
B1-20	69.7	70.8	70.8	43.2	27.1	75.2	77.0	71.1	71.1	71.0	70.8	70.9	22.1	
B1-21	-44.5	-44.7	-44.7	-44.5	-44.2	-44.2	-45.8	-47.5	-46.0	-45.1	-44.7	-44.8	-44.7	-44.6
B1-22	-87.5	-87.3	-87.1	-87.0	-87.0	-87.0	-86.9	-87.1	-87.0	-86.9	-87.0	-86.9	-87.1	-87.1
B1-23	-53.0	-53.2	-53.5	-53.4	-53.6	-53.8	-53.7	-55.6	-56.8	-57.0	-56.7	-56.8	-57.0	-56.8
B1-24	-11.5	-12.3	-12.5	-12.6	-12.5	-12.7	-15.0	-18.6	-16.6	-15.4	-14.9	-14.7	-14.8	-14.6
B1-25	-17.1	-17.7	-17.6	-16.7	-17.3	-24.7	-29.5	-20.6	-18.3	-18.0	-17.7	-17.9	-17.7	-18.3
B1-26	-32.4	-34.0	-33.7	-32.8	-33.0	-34.8	-38.6	-37.2	-35.5	-34.7	-33.6	-33.8	-33.6	-34.1
B1-27	-43.0	-49.1	-49.3	-48.4	-48.8	-48.9	-49.0	-51.7	-51.3	-50.3	-49.1	-49.2	-49.8	-49.4
B1-28	-55.4	-55.6	-55.8	-53.0	-54.6	-60.2	-55.2	-51.4	-52.9	-53.8	-54.0	-54.0	-54.9	-55.2
B1-29	55.7	56.7	56.6	61.4	61.8	14.5	0.1	54.2	56.3	56.7	45.3	56.6	55.9	60.6
B1-30	49.1	50.5	50.4	65.0	65.6	49.3	23.7	47.6	50.1	50.5	49.7	50.0	49.8	62.2
B1-31	-25.6	-26.4	-26.7	-28.2	-32.9	-22.9	-0.6	-22.6	-24.1	-25.0	-25.2	-25.1	-26.3	-34.5
B1-32	-0.5	-0.5	-0.1	1.0	0	-13.7	-18.3	-2.7	-1.5	-1.0	-1.5	-1.5	-0.4	-1.9
B1-33	-6.9	-7.7	-7.5	-5.9	-6.6	-18.2	-23.1	-10.2	-8.6	-8.4	-7.9	-8.0	-7.2	-8.7
B1-34	3.7	2.5	2.8	5.4	3.9	-4.9	-8.8	3.7	3.4	3.2	3.9	3.4	3.8	1.5
B1-35	-69.9	-70.5	-70.4	-69.1	-69.2	-70.5	-69.9	-67.7	-68.5	-69.1	-68.2	-68.8	-69.1	-69.4
B1-36	2.0	1.5	1.7	2.4	3.3	-3.7	-15.3	-4.4	-1.2	-0.4	-0.2	-0.4	0.1	1.2
B1-37	32.0	32.0	32.0	31.8	30.8	20.5	9.2	28.4	30.6	31.3	31.3	31.2	31.4	29.5
B2-10	89.2	90.6	90.6	91.5	91.3	43.3	32.7	90.4	90.5	90.5	90.7	90.5	90.7	90.1
B2-11	61.4	62.2	62.2	68.0	67.0	37.8	32.2	60.0	61.3	61.9	62.0	62.1	62.0	63.9
B2-12	59.3	60.1	60.1	68.8	68.2	36.6	31.2	57.3	59.3	60.0	60.1	60.3	60.1	65.1
B2-13	64.6	65.7	65.8	60.0	50.5	53.8	56.3	65.8	65.8	65.9	65.7	65.7	65.8	44.8
B2-28	70.1	73.9	74.5	77.1	79.8	16.5	0.1	73.1	72.9	73.4	70.3	70.3	73.2	76.3
B2-30	64.5	65.4	65.7	74.6	74.7	73.5	67.2	63.7	64.3	64.4	65.2	65.0	65.5	70.5
B2-31	57.8	58.7	59.0	52.9	50.0	59.6	54.0	57.5	58.3	58.8	58.5	58.6	58.6	47.9
83	57.0	58.5	58.6	65.9	65.4	62.3	60.0	57.0	58.1	58.6	57.3	58.0	57.5	61.8
84	62.0	62.9	63.4	69.0	68.6	65.9	63.9	60.6	62.2	62.9	61.9	62.0	62.5	65.6

## Differential Temperatures (F)

T2-T3	30.06	31.24	31.19	24.09	25.66	24.21	24.13	32.68	31.76	31.48	-	31.36	-	29.75
T5-T6	32.19	33.34	33.16	24.98	26.53	26.31	26.14	34.18	33.68	33.56	-	33.46	-	30.28
T7-T8	35.70	36.76	36.63	28.65	30.60	27.78	27.90	37.80	37.02	36.84	-	36.76	-	34.22

## Flow Distribution (Pounds per Hour)

W1	200	200	200	203	202	200	200	200	200	200	-	200	-	200
W2	187	188	188	191	193	191	193	190	190	189	-	189	-	190
W5	96	98	98	100	101	99	97	94	99	97	-	93	-	87
W7	103	105	102	105	105	104	106	101	106	108	-	108	-	111



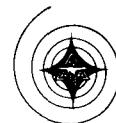
## Test Data in Degrees F - Test Runs 21 Through 28

Thermocouple No.	Elapsed Time (Minutes)													
	Run 21			Run 22			Run 23		Run 26		Run 27			Run 28
	1	20	20	40	65	24	2	10	20	40	60	16	30	
1	97.3	98.2	97.1	97.8	98.3	97.8	97.2	91.4	98.4	97.8	98.2	89.0	87.5	
2	94.3	94.7	94.4	94.6	95.6	94.3	94.7	89.6	94.7	94.2	95.3	86.9	83.9	
3	65.5	66.9	60.9	61.2	61.2	61.3	59.0	46.3	60.1	62.3	62.1	39.3	26.5	
3A	65.2	68.0	59.5	61.4	63.6	61.4	61.2	67.9	60.1	60.6	63.8	73.0	79.8	
4	67.6	68.7	62.7	62.5	61.4	63.4	64.9	76.0	61.1	63.6	62.6	80.4	83.0	
5	99.1	99.9	98.3	99.6	98.7	99.6	99.8	98.4	100.1	97.8	99.3	97.7	92.1	
6	65.8	69.6	62.7	62.7	62.7	62.3	63.5	63.6	61.6	62.9	63.6	65.1	64.3	
7	98.4	98.8	97.8	98.5	98.8	98.4	98.6	97.1	98.9	97.5	98.9	96.5	92.6	
8	63.1	65.2	59.0	60.0	60.5	60.1	60.2	60.8	58.9	60.1	60.6	61.5	61.8	
A1-10	88.3	88.8	87.4	87.2	87.6	87.1	70.9	29.7	86.9	87.5	87.8	8.6	-18.8	
A1-11	1.5	10.1	30.4	37.0	39.3	39.7	36.4	11.1	-0.9	1.4	2.3	-13.8	-31.8	
A1-12	53.4	56.2	50.7	50.6	50.6	50.9	41.5	13.4	45.3	48.7	48.4	-10.0	-29.7	
A1-13	50.3	56.0	49.3	48.9	48.8	49.1	45.0	24.2	39.4	45.1	45.4	2.4	-18.0	
A1-28	-9.0	31.8	50.9	56.0	57.1	57.9	42.6	-0.5	8.5	7.3	10.6	-31.4	-45.0	
A1-30	54.4	53.2	47.7	49.4	49.9	50.1	55.9	52.9	39.5	44.1	44.7	43.7	39.9	
A1-31	0.9	22.8	32.3	36.6	38.1	38.1	39.6	9.4	3.3	6.1	9.2	-21.1	-38.7	
A2-10	90.6	91.3	89.5	89.8	90.2	89.6	71.9	32.1	89.7	89.5	90.1	11.9	-16.1	
A2-11	71.3	72.8	68.0	67.2	67.2	66.6	63.0	40.7	67.0	68.1	68.4	29.5	12.4	
A2-12	74.3	75.4	71.4	70.4	70.3	69.7	64.0	43.2	69.9	71.0	70.9	32.4	17.2	
A2-13	71.6	73.2	67.5	66.9	66.6	66.3	63.4	41.7	67.4	68.1	68.1	25.8	4.6	
A2-28	81.5	82.3	79.5	79.1	79.0	78.8	65.7	37.8	79.0	79.5	79.5	27.3	15.2	
A2-30	78.3	79.5	74.4	73.8	73.4	72.9	78.3	66.2	74.2	75.0	75.2	52.5	35.0	
A2-31	71.9	73.3	68.2	67.5	67.3	66.8	66.4	40.3	67.3	68.1	68.1	26.3	10.3	
B1-9	15.0	-13.4	-1.0	2.4	6.7	9.4	4.9	-9.8	-4.4	0.5	5.2	-22.9	-40.9	
B1-10	88.7	29.2	88.3	88.4	88.4	88.8	66.5	28.2	88.1	88.8	88.6	8.1	-20.2	
B1-11	3.1	-22.4	-2.7	4.6	6.2	6.8	5.8	-14.3	0.2	5.4	6.6	-27.8	-46.8	
B1-12	56.6	-16.4	39.7	45.4	46.8	47.2	22.3	-6.9	42.8	46.3	47.2	-22.4	-43.8	
B1-13	16.0	5.5	31.2	36.1	39.0	40.2	25.9	-0.8	27.4	35.9	38.8	-16.7	-37.9	
B1-14	50.1	85.7	88.4	88.6	88.5	88.6	73.9	34.8	88.0	88.7	88.7	11.9	-19.9	
B1-15	9.7	18.1	23.9	33.0	37.3	39.0	31.2	3.7	21.1	32.3	37.1	-14.7	-40.3	
B1-16	13.7	3.2	10.3	12.5	14.7	16.3	24.2	3.5	8.2	11.5	14.1	-11.9	-33.8	
B1-17	15.2	56.3	52.5	53.4	54.8	55.0	36.8	10.0	50.7	54.0	54.2	-7.3	-30.3	
B1-18	-2.9	-7.5	-0.2	9.9	14.3	16.0	11.6	-8.2	-0.5	9.1	13.8	-23.4	-45.6	
B1-19	34.1	31.5	52.3	56.0	57.7	58.5	48.2	14.1	49.9	56.2	57.9	-6.8	-35.1	
B1-20	21.4	71.1	69.1	69.9	70.2	70.3	59.2	22.4	67.8	70.1	70.3	0	-30.6	
B1-21	-44.5	-46.4	-49.5	-49.1	-48.1	-47.3	-47.3	-47.3	-49.9	-49.5	-49.1	-49.4	-52.7	
B1-22	-87.1	-87.5	-87.8	-88.6	-89.6	-89.9	-89.9	-89.9	-90.1	-90.4	-91.1	-91.4	-91.9	
B1-23	-56.8	-56.9	-58.1	-59.4	-59.4	-58.6	-58.6	-58.5	-59.3	-60.0	-59.7	-59.4	-60.0	
B1-24	-14.5	-16.4	-20.0	-17.8	-16.4	-15.7	-15.6	-15.8	-19.0	-17.4	-16.4	-17.1	-24.0	
B1-25	-18.6	-35.5	-29.7	-22.7	-20.4	-19.4	-19.5	-28.5	-25.9	-22.1	-20.2	-37.7	-52.3	
B1-26	-33.8	-41.1	-43.8	-39.5	-37.5	-35.7	-35.6	-37.7	-40.8	-37.9	-37.4	-43.0	-51.2	
B1-27	-48.8	-50.4	-53.8	-54.2	-53.3	-51.2	-51.2	-51.2	-53.6	-53.5	-53.2	-53.4	-55.8	
B1-28	-55.6	-65.0	-66.3	-65.2	-63.1	-60.8	-61.3	-63.3	-68.0	-67.1	-64.3	-67.7	-73.5	
B1-29	60.3	-3.6	52.1	55.0	55.4	55.6	38.0	5.3	53.2	54.9	56.2	-10.3	-32.0	
B1-30	62.2	25.6	41.4	47.6	49.2	48.9	49.7	37.2	45.3	47.9	49.5	22.0	-0.6	
B1-31	-34.9	-42.4	-42.4	-38.3	-34.5	-31.8	-30.4	-40.3	-46.1	-40.3	-35.1	-49.1	-61.6	
B1-32	-2.1	-28.7	-12.6	-5.2	-2.4	-2.6	-4.9	-21.0	-9.1	-4.4	-2.9	-32.8	-50.1	
B1-33	-8.6	-32.1	-19.4	-12.5	-9.9	-9.3	-10.6	-24.1	-16.0	-11.5	-10.3	-35.1	-51.1	
B1-34	1.4	-16.0	-6.3	-4.4	-2.6	-0.7	-1.0	-12.4	-8.3	-4.3	-3.2	-23.8	-39.8	
B1-35	-68.9	-73.4	-75.0	-76.1	-75.7	-73.5	-73.2	-73.7	-76.8	-77.0	-76.7	-76.8	-78.4	
B1-36	1.0	-16.0	-8.1	-3.2	-1.5	-1.2	-1.2	-10.0	-5.1	-2.2	-1.6	-19.0	-33.2	
B1-37	29.4	8.6	27.6	30.0	30.6	31.0	30.5	14.7	27.8	30.2	30.6	0.1	-23.0	
B2-10	90.2	32.6	90.5	90.3	90.5	90.5	68.0	29.5	90.2	90.5	90.4	8.7	-19.6	
B2-11	63.9	29.8	61.1	61.5	61.8	61.9	47.4	21.0	60.9	61.9	62.1	6.4	-15.5	
B2-12	65.1	28.8	58.6	59.2	59.4	59.9	46.1	20.7	58.5	59.6	60.2	6.1	-15.4	
B2-13	44.2	51.2	66.2	65.8	65.6	65.5	56.9	27.6	65.4	65.9	65.9	8.5	-17.6	
B2-28	75.1	1.7	69.9	71.6	74.9	70.1	39.7	3.0	70.9	70.6	72.3	-9.9	-29.6	



## Test Data in Degrees F - Test Runs 21 Through 28 (Cont)

Thermocouple No.	Elapsed Time (Minutes)												
	Run 21		Run 22			Run 23	Run 26		Run 27			Run 28	
	1	20	20	40	65	24	2	10	20	40	60	16	30
B2-30	70.5	64.4	63.9	64.5	65.0	64.8	64.5	61.2	64.0	65.2	65.1	57.3	45.5
B2-31	47.8	47.1	58.4	58.4	58.6	58.2	53.1	14.7	58.0	58.8	58.8	-4.6	-28.0
83	61.4	58.3	55.2	56.7	57.5	56.7	56.2	55.4	55.6	56.5	57.9	54.9	52.5
84	65.1	65.8	59.0	59.1	59.9	58.7	58.3	57.4	59.1	60.7	61.0	58.9	57.0
Differential Temperatures (F)													
T2-T3	-	27.97	-	-	33.09	33.30	-	28.04	-	-	32.37	-	49.85
T5-T6	-	29.09	-	-	35.29	35.29	-	32.89	-	-	34.42	-	29.78
T7-T8	-	36.56	-	-	37.24	37.27	-	34.78	-	-	36.87	-	32.42
Flow Distribution (Pounds per Hour)													
W1	-	200	-	-	200	200	-	-	-	-	200	-	-
W2	-	189	-	-	188	188	-	-	-	-	188	-	-
W5	-	99	-	-	97	98	-	-	-	-	90	-	-
W7	-	105	-	-	100	98	-	-	-	-	103	-	-
Pressures (Pounds per Square Inch)													
P2-P3	-	1.35	-	-	1.05	1.05	-	-	-	-	1.80	-	-



## Test Data in Degrees F - Test Runs 29 Through 33

Thermocouple No.	Elapsed Time (Minutes)												Run #33	
	Run #29						Run #32							
	1	15	30	45	60	75	90	0	15	30	45	60	10	20
1	97.9	98.3	97.5	98.4	97.9	97.5	98.5	77.3	76.7	75.9	75.8	76.3	76.4	76.7
2	90.3	95.9	94.8	96.5	95.3	94.3	96.6	76.2	74.9	75.6	73.7	75.5	73.5	74.0
3	56.2	59.8	67.2	67.7	68.1	67.4	66.9	48.5	48.2	47.4	47.3	47.1	51.3	51.8
3A	68.9	56.7	65.1	68.0	67.6	66.3	67.3	48.6	48.1	48.6	47.9	48.8	52.7	52.2
4	68.8	57.3	67.3	65.5	67.0	68.2	64.9	48.4	50.5	47.2	50.8	46.2	55.3	51.4
5	91.9	100.1	97.1	97.8	97.1	99.7	97.4	76.4	77.5	75.9	78.3	75.6	78.8	76.3
6	54.1	65.7	68.0	68.4	67.8	68.1	67.4	48.5	48.6	48.4	48.1	48.2	55.0	53.9
7	90.8	99.2	97.4	98.4	98.2	98.5	98.1	77.4	77.3	76.5	77.1	76.8	77.5	77.3
8	25.6	49.5	63.9	65.3	64.2	64.7	60.1	45.9	45.6	45.1	44.1	44.8	45.5	47.9
A1-10	30.7	56.7	70.7	76.7	79.1	80.5	82.7	70.0	69.6	69.1	68.4	69.0	68.8	68.9
A1-11	-37.9	-51.5	-53.5	-50.3	-46.1	-42.9	-38.2	30.9	31.5	31.1	31.0	31.2	43.8	43.7
A1-12	-33.1	-47.1	-48.3	-45.1	-39.6	-34.4	-26.6	40.1	40.5	39.6	39.4	39.4	45.3	43.9
A1-13	-24.4	-27.1	-2.1	9.5	17.1	21.6	24.3	36.1	36.4	35.4	35.7	35.1	29.2	19.3
A1-28	-44.1	-52.5	-57.6	-58.4	-57.2	-55.6	-55.1	45.0	46.0	45.0	45.7	45.2	55.1	54.6
A1-30	-24.5	-46.9	-51.0	-48.0	-43.3	-37.5	-30.9	36.5	37.0	36.4	36.6	36.5	49.8	49.1
A1-31	-41.6	-49.1	-50.4	-46.9	-44.7	-41.7	-39.9	27.8	27.9	28.0	27.9	28.1	32.2	31.8
A2-10	65.7	90.5	90.4	91.0	90.4	90.5	91.1	71.4	71.1	70.6	69.8	70.7	70.1	71.1
A2-11	27.1	71.3	72.4	73.0	72.9	72.5	73.0	55.3	54.8	54.5	53.8	54.2	56.0	55.6
A2-12	48.0	72.3	74.2	74.4	74.8	74.0	74.8	58.5	58.1	57.7	57.0	57.3	60.0	59.7
A2-13	-2.6	68.7	71.9	71.9	71.8	71.7	51.8	51.6	51.1	50.9	50.8	43.9	38.1	
A2-28	59.4	80.4	80.9	81.1	81.1	80.9	81.1	64.2	63.5	63.2	63.3	65.7	65.5	
A2-30	54.0	79.1	79.2	79.1	79.0	78.8	79.0	59.1	59.0	58.5	58.0	58.3	63.0	62.7
A2-31	12.2	72.5	72.4	71.9	71.8	71.5	71.6	54.6	54.4	53.8	53.7	53.6	51.6	50.4
B1-9	-38.2	-41.4	-30.6	-20.5	-17.9	-17.2	-16.4	29.9	32.8	35.0	38.0	40.8	59.6	60.5
B1-10	43.5	47.0	53.8	67.9	73.9	76.6	77.9	70.3	70.6	69.3	69.7	69.0	69.8	68.7
B1-11	-49.6	-61.0	-68.1	-67.7	-64.8	-61.7	-58.8	-4.0	-4.7	-5.2	-5.7	-5.7	27.3	39.0
B1-12	-40.0	-55.0	-63.1	-63.5	-60.8	-57.7	-54.4	37.7	37.5	37.0	36.8	36.9	43.6	44.2
B1-13	-41.9	-52.9	-29.8	-7.4	2.8	8.9	12.8	32.5	33.1	32.8	33.2	33.5	25.7	17.2
B1-14	19.1	53.9	79.9	84.1	85.6	86.2	86.8	70.1	70.1	69.1	69.0	69.0	42.1	36.9
B1-15	-42.1	-52.5	-42.7	-28.0	-19.3	-13.3	-9.6	34.9	35.8	35.7	36.4	37.0	14.5	11.6
B1-16	-40.3	-40.2	-11.2	2.6	5.3	6.4	6.6	17.0	18.3	19.0	20.3	21.6	29.5	27.8
B1-17	-35.1	-33.6	21.4	39.8	45.0	46.2	48.4	43.2	44.0	42.9	42.6	42.6	25.2	17.4
B1-18	-47.5	-59.4	-61.7	-55.2	-49.6	-45.0	-41.5	16.1	17.0	17.7	18.3	19.5	7.9	14.4
B1-19	-36.8	-40.3	-7.5	13.0	23.1	29.4	46.3	46.7	46.0	46.3	46.1	34.8	25.1	
B1-20	-31.1	-13.1	44.0	57.6	61.5	63.6	64.8	54.1	54.1	53.3	53.3	53.1	24.3	12.9
B1-21	-53.5	-57.8	-57.5	-56.2	-54.6	-53.7	-53.0	-24.5	-23.2	-22.7	-21.8	-21.1	-20.0	-18.8
B1-22	-91.3	-91.8	-92.3	-93.4	-94.2	-95.2	-96.1	-63.4	-61.9	-60.8	-59.2	-58.4	-57.4	-56.6
B1-23	-59.9	-62.1	-64.6	-66.9	-68.5	-69.8	-71.3	-44.0	-43.0	-42.4	-41.4	-40.9	-40.3	-39.9
B1-24	-25.2	-31.0	-29.2	-27.5	-26.0	-24.7	-23.6	-5.9	-5.6	-5.1	-4.5	-4.5	-3.9	-3.9
B1-25	-54.3	-64.4	-72.2	-74.7	-74.3	-72.7	-70.9	-17.1	-16.9	-16.6	-16.4	-16.0	-8.0	2.6
B1-26	-53.0	-62.1	-67.8	-72.7	-73.8	-74.4	-73.8	-22.1	-20.9	-21.0	-19.5	-20.1	-17.7	-12.0
B1-27	-56.2	-61.7	-66.1	-71.0	-73.3	-74.8	-76.4	-30.8	-29.4	-29.1	-27.5	-27.8	-27.5	-26.0
B1-28	-73.5	-80.4	-84.7	-85.0	-83.5	-81.4	-81.4	-33.1	-29.4	-24.7	-19.4	-14.2	37.3	45.4
B1-29	-18.2	-25.2	-38.0	-40.8	-39.0	-34.6	-31.9	45.1	44.7	44.8	44.3	43.0	46.9	47.0
B1-30	-38.9	-54.6	-64.3	-65.5	-63.6	-59.6	-56.8	35.0	33.6	32.6	30.4	30.2	46.0	48.8
B1-31	-63.4	-72.5	-74.6	-69.4	-64.9	-61.4	-61.4	-17.0	-15.0	-12.2	-9.0	-6.0	16.7	26.9
B1-32	-52.2	-62.3	-69.9	-70.5	-69.5	-67.8	-64.3	-5.9	-5.5	-6.2	-6.5	-6.0	10.4	19.4
B1-33	-53.2	-63.0	-70.5	-72.7	-71.3	-70.1	-67.2	-10.6	-10.0	-10.5	-10.2	-10.4	1.9	11.9
B1-34	-41.5	-31.2	-21.2	-15.4	-12.5	-12.4	-11.5	6.9	8.8	9.3	11.5	11.5	17.2	19.5
B1-35	-79.0	-83.8	-86.4	-89.0	-88.2	-88.1	-88.2	-49.0	-48.0	-44.4	-40.5	-38.9	-28.8	-17.2
B1-36	-34.9	-37.4	-43.0	-47.7	-48.7	-48.0	-46.4	3.9	4.5	4.6	4.8	4.9	6.1	5.9
B1-37	-23.0	5.8	9.8	15.0	17.8	19.9	21.4	24.3	24.6	24.2	24.2	24.2	23.7	22.8
B1-38	69.4	90.2	90.8	91.0	91.2	91.0	91.2	71.6	71.9	70.8	70.8	70.7	70.8	70.1
B2-11	32.7	60.7	67.5	67.0	67.9	68.0	67.7	48.2	48.1	47.5	47.4	47.2	49.5	48.4
B2-12	21.0	63.1	65.4	65.2	65.8	65.4	65.4	46.3	46.0	45.4	45.3	45.3	50.0	48.9
B2-13	-23.8	52.2	69.2	69.9	69.9	69.9	69.7	49.8	49.7	48.9	48.5	48.6	38.5	30.4
B2-28	40.3	75.3	74.4	76.7	74.4	74.9	76.9	58.4	58.3	57.0	54.2	56.3	61.7	57.5
B2-30	45.7	70.0	71.6	71.7	71.5	71.2	71.5	50.4	50.6	49.5	49.3	49.0	55.4	54.2
B2-31	-23.0	60.1	65.1	64.3	63.8	63.7	63.0	44.3	44.2	43.4	43.0	43.0	37.7	34.9
S3	22.0	62.8	65.0	64.7	63.7	64.1	63.7	44.3	44.0	43.3	42.0	42.4	45.3	45.3
S4	41.3	69.0	68.4	68.2	67.1	66.6	66.0	46.7	47.5	46.3	45.9	45.9	51.4	50.5

Differential Temperatures (F)														
T2-T3	-	32.96	27.95	27.18	27.38	27.71	28.13	26.71	26.71	26.30	26.54	26.54	-	23.34
T5-T6	-	32.20	29.63	29.58	29.80	30.13	30.43	28.33	28.22	27.84	27.88	27.91	-	22.73
T7-T8	-	33.79	33.64	32.74	32.73	32.87	32.92	31.10	31.33	31.05	31.18	31.33	-	30.43

Flow Distribution (Pounds per Hour)														
A1	200	200	200	200	200	200	200	200	200	200	200	200	-	200
A2	-	191	190	187	187	187	187	184	180	180	180	183	-	180
A3	-	98	96	94	-	93	93	92	95	95	95	96	-	97

Pressures (Pounds per Square Inch)															
A2-A3	-	-	-	-	-	-	1.14	-	-	-	-	-	1.35	-	1.70

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## Test Data in Degrees F - Test Runs 34 Through 42

Thermo-couple No.	Elapsed Time (Minutes)											
	Run 34		Run 35			Run 40		Run 41		Run 42		
	10	20	15	30	45	60	15	30	10	20	10	20
1	76.5	76.6	76.6	76.2	76.3	75.5	75.7	75.7	76.0	76.3	76.5	76.8
2	74.7	74.4	75.5	73.5	74.3	74.0	75.5	73.4	74.9	75.8	74.3	76.2
3	54.1	55.0	44.0	45.4	45.9	46.5	46.3	46.3	48.8	48.2	47.8	49.4
3A	52.2	55.9	46.7	46.6	47.9	48.8	47.1	46.8	49.5	50.5	49.0	51.1
4	54.2	57.5	44.7	49.0	48.6	47.9	46.1	49.8	49.9	49.2	50.6	51.7
5	79.0	79.4	78.0	78.3	78.9	75.6	75.1	77.9	75.2	75.2	79.0	77.6
6	56.2	56.3	47.3	47.5	47.9	47.2	47.5	47.9	49.4	50.2	53.6	53.4
7	78.0	77.9	78.1	77.1	77.5	75.9	75.7	77.1	76.2	76.5	77.8	77.8
8	52.7	53.0	41.7	42.2	42.9	43.4	44.4	42.8	46.2	45.7	43.7	45.7
A1-10	28.4	22.7	68.3	68.1	68.1	68.6	69.0	68.3	69.1	69.5	69.3	69.8
A1-11	17.4	14.3	21.1	27.8	29.4	30.4	30.4	30.1	35.7	36.8	41.0	41.9
A1-12	18.8	15.8	35.5	38.0	38.4	39.1	38.9	38.8	42.2	42.6	45.3	45.3
A1-13	32.8	35.6	33.7	34.9	34.9	35.0	34.5	35.2	38.4	39.2	42.7	42.6
A1-28	3.1	-5.2	38.5	43.4	44.8	44.8	44.3	45.1	48.2	48.8	52.5	52.4
A1-30	44.2	44.7	30.1	34.3	35.4	35.2	35.4	35.9	40.3	41.5	47.0	47.0
A1-31	29.8	26.4	21.6	25.5	26.8	27.0	27.2	27.3	30.8	32.1	36.7	37.6
A2-10	30.4	24.8	70.3	69.7	69.8	70.2	70.4	69.7	70.5	70.7	70.9	71.5
A2-11	42.0	39.7	52.6	53.1	53.1	53.7	54.0	53.4	55.4	55.7	56.4	57.0
A2-12	43.6	41.6	55.5	56.5	56.5	57.2	57.1	56.8	58.8	59.0	59.5	59.9
A2-13	48.0	49.8	51.3	50.6	50.5	50.5	50.4	50.5	52.5	52.8	54.8	54.8
A2-28	38.2	34.2	62.8	62.7	63.0	63.1	63.0	63.0	64.1	64.2	65.1	65.1
A2-30	53.3	46.5	57.1	57.5	57.5	57.7	57.8	57.8	59.6	59.9	61.8	61.8
A2-31	54.2	52.9	53.1	53.2	53.3	53.5	53.2	53.3	55.1	55.4	56.9	57.0
B1-9	16.2	12.0	55.3	58.5	59.0	59.4	59.3	59.4	61.2	60.5	12.1	5.7
B1-10	27.0	21.9	68.9	69.1	69.2	69.0	68.8	69.3	68.5	68.0	26.8	19.8
B1-11	11.7	7.5	13.2	26.3	29.7	30.9	31.0	31.3	40.2	40.1	9.4	1.6
B1-12	13.5	9.3	35.6	38.5	39.3	39.8	39.6	39.6	43.0	42.5	11.1	3.8
B1-13	31.5	33.1	36.6	37.3	37.5	37.8	37.6	37.6	24.3	15.2	20.0	23.7
B1-14	68.2	68.0	68.8	68.8	68.7	68.7	68.7	68.7	40.0	35.2	66.7	65.8
B1-15	52.2	52.9	40.8	42.9	43.6	43.8	43.8	43.8	19.4	11.6	41.8	43.0
B1-16	34.9	34.1	30.6	33.6	35.2	35.5	35.6	35.6	31.8	27.3	23.6	22.4
B1-17	52.8	54.6	43.7	44.9	44.8	44.7	44.8	44.3	26.3	19.9	44.7	46.8
B1-18	41.9	39.4	28.3	34.2	35.7	36.4	36.4	36.2	21.0	16.6	30.5	25.6
B1-19	38.0	41.3	46.9	46.9	47.1	47.0	46.8	47.1	30.9	20.4	30.2	35.3
B1-20	58.0	59.0	53.1	52.6	52.4	52.4	52.4	52.4	20.7	9.4	52.9	55.1
B1-21	-17.9	-18.7	-21.1	-18.9	-16.8	-15.8	-14.8	-15.3	-15.5	-14.7	-14.7	-17.0
B1-22	-55.3	-54.0	-52.6	-51.7	-50.4	-49.0	-47.8	-47.4	-47.3	-46.7	-45.8	-45.8
B1-23	-39.9	-40.0	-40.4	-41.2	-41.0	-41.0	-40.5	-40.2	-39.9	-39.5	-39.2	-39.4
B1-24	-4.4	-6.4	-9.3	-7.7	-6.4	-5.5	-5.0	-4.8	-4.3	-4.1	-4.6	-7.0
B1-25	-6.1	-11.0	-8.6	-0.5	2.4	4.0	4.5	4.9	8.3	8.8	-3.4	-11.8
B1-26	-10.6	-13.6	-15.1	-10.8	-7.6	-6.6	-5.8	-3.6	-3.3	-2.5	-4.9	-11.6
B1-27	-23.6	-23.4	-23.6	-24.0	-21.9	-20.6	-19.4	-17.9	-18.2	-17.9	-15.8	-17.5
B1-28	-10.7	-20.2	26.4	35.6	37.9	39.1	39.5	39.6	46.2	46.5	-5.3	-19.6
B1-29	9.1	0.8	41.9	42.9	43.0	43.7	43.9	43.1	45.4	45.3	9.5	0.5
B1-30	34.8	24.3	26.0	35.0	36.9	38.3	38.4	37.5	47.1	47.1	36.4	23.4
B1-31	26.2	21.7	16.8	25.6	27.8	28.9	29.2	29.0	30.5	28.9	14.2	6.9
B1-32	1.7	-1.8	3.5	13.8	16.9	17.3	17.3	17.8	23.8	23.7	1.8	-6.0
B1-33	-1.9	-5.9	-1.6	7.1	10.4	11.0	11.0	12.2	16.4	16.4	-0.7	-9.4
B1-34	5.5	-0.5	16.0	19.5	21.2	21.0	21.2	22.3	21.6	21.1	5.0	-4.2
B1-35	-23.4	-30.2	-22.5	-16.1	-12.0	-10.4	-9.2	-8.0	-7.1	-6.1	-14.0	-25.2
B1-36	-1.5	-7.6	-0.4	3.1	4.2	4.6	4.7	4.8	5.8	5.8	-1.0	-8.2
B1-37	11.3	4.6	20.0	22.8	23.5	23.7	23.8	23.9	22.9	22.0	11.8	3.6
B2-10	28.1	22.6	70.2	70.3	70.4	70.2	70.2	70.5	70.1	69.7	28.1	21.3
B2-11	24.8	20.9	43.5	43.7	44.0	44.2	44.3	44.3	45.6	45.1	21.4	17.5
B2-12	23.8	20.2	40.3	40.7	40.8	41.5	41.5	41.3	45.8	45.4	20.4	16.3
B2-13	39.1	40.9	47.5	46.9	46.5	46.5	46.4	46.1	32.7	24.8	31.5	35.1
B2-28	4.4	1.0	51.9	55.4	55.3	55.1	54.1	53.1	59.7	59.6	2.8	-3.5



## Test Data in Degrees F - Test Runs 34 Through 42 (Cont)

Thermo-couple No.	Elapsed Time (Minutes)											
	Run 34		Run 35			Run 40		Run 41		Run 42		
	10	20	15	30	45	60	15	30	10	20	10	20
B2-30	49.1	47.7	44.9	45.1	45.5	45.3	45.3	45.6	50.8	50.7	46.1	44.1
B2-31	41.3	39.0	39.9	40.3	40.1	40.2	40.0	40.1	35.1	33.2	32.3	29.4
83	42.9	42.6	38.0	39.8	40.7	40.5	40.4	40.0	44.6	43.8	40.3	39.6
84	48.1	47.7	44.3	45.1	45.9	45.4	45.0	45.4	48.4	48.9	50.3	50.9
Differential Temperatures (F)												
T2-T3	-	19.33	29.11	28.13	27.86	27.31	-	27.41	-	25.35	-	24.49
T5-T6	-	20.61	28.96	28.31	28.39	28.10	-	28.10	-	25.67	-	23.06
T7-T8	-	23.26	34.00	32.93	32.51	32.26	-	32.27	-	30.76	-	30.27
Flow Distribution (Pounds per Hour)												
W1	-	200	200	200	200	200	-	200	-	200	-	200
W2	-	180	181	180	183	185	-	184	-	182	-	181
W5	-	95	96	95	91	98	-	94	-	131	-	120
W7	-	100	98	102	102	101	-	101	-	66	-	73
Pressures (Pounds per Square Inch)												
P2-P3	-	2.3	1.45	1.35	-	1.36	-	1.35	-	1.78	-	1.43



## Test Data in Degrees F - Test Runs 43 Through 49

Thermocouple No.	Run 43										Run 44										Run 45										Run 46										Run 47										Run 48		Run 49	
	Run 43					Run 44					Run 45					Run 46					Run 47					Run 48					Run 49					Run 48		Run 49																
	7	22	52	62	15	35	5	10	5	20	35	50	70	90	110	130	140	10	20	30	10	20	30	10	20	30	40	60	80	35	49																							
1	75.9	75.9	75.7	75.8	75.7	76.6	76.4	77.5	76.5	76.1	75.9	75.2	75.8	76.0	76.1	75.7	78.2	79.2	79.6	75.7	76.4	76.5	75.6	76.4	76.5	75.9	77.0	77.0	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3																
2	73.5	71.1	73.3	73.5	75.2	68.3	69.3	75.6	70.4	71.0	73.9	71.0	73.6	74.1	73.2	74.7	74.6	74.3	69.3	65.9	64.2	72.7	73.4	73.6	75.6	75.6	75.6	75.6	75.6	75.6	75.6	75.6	75.6	75.6	75.6	75.6	75.6	75.6	75.6															
3	42.6	45.7	46.4	45.6	46.6	46.1	37.4	41.3	57.5	39.2	41.3	43.3	45.8	46.6	44.8	46.5	42.9	20.2	11.8	31.1	38.1	51.1	41.1	47.0	48.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2	58.2													
3A	45.9	46.2	47.6	46.6	43.0	48.9	52.2	57.4	47.5	41.7	43.0	43.6	46.3	47.4	47.1	46.5	56.2	65.9	73.0	34.3	39.8	44.9	46.7	48.6	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7														
4	48.9	48.7	49.9	45.9	45.9	49.6	52.2	67.0	49.6	50.1	49.7	46.8	49.3	50.1	49.3	48.4	46.4	48.4	47.3	50.1	49.4	48.4	47.6	48.4	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6														
5	77.9	49.5	78.1	77.7	75.0	78.1	75.7	78.4	78.7	75.7	75.7	76.1	78.0	78.2	75.6	75.1	77.8	76.5	72.3	76.4	77.5	76.4	75.1	76.8	75.1	76.8	75.1	76.8	75.1	76.8	75.1	76.8	75.1	76.8	75.1	76.8	75.1	76.8	75.1	76.8														
6	50.5	47.9	48.0	47.9	47.8	48.3	48.8	34.0	43.9	44.6	45.3	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	49.1	49.3	35.9	44.8	44.7	46.2	49.3	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9													
7	77.1	76.2	77.2	77.0	76.5	74.8	73.9	75.0	74.7	77.1	75.9	76.1	76.2	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1															
8	35.1	41.9	42.0	42.8	42.8	43.5	43.5	43.5	43.5	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1														
A1-10	A1-11	A1-12	A1-13	A1-14	A1-15	A1-16	A1-17	A1-18	A1-19	A1-20	A1-21	A1-22	A1-23	A1-24	A1-25	A1-26	A1-27	A1-28	A1-29	A1-30	A1-31	A1-32	A1-33	A1-34	A1-35	A1-36	A1-37	A1-38	A1-39	A1-40	A1-41	A1-42	A1-43	A1-44	A1-45	A1-46	A1-47	A1-48	A1-49	A1-50														
B1-10	B1-11	B1-12	B1-13	B1-14	B1-15	B1-16	B1-17	B1-18	B1-19	B1-20	B1-21	B1-22	B1-23	B1-24	B1-25	B1-26	B1-27	B1-28	B1-29	B1-30	B1-31	B1-32	B1-33	B1-34	B1-35	B1-36	B1-37	B1-38	B1-39	B1-40	B1-41	B1-42	B1-43	B1-44	B1-45	B1-46	B1-47	B1-48	B1-49	B1-50														
C1-10	C1-11	C1-12	C1-13	C1-14	C1-15	C1-16	C1-17	C1-18	C1-19	C1-20	C1-21	C1-22	C1-23	C1-24	C1-25	C1-26	C1-27	C1-28	C1-29	C1-30	C1-31	C1-32	C1-33	C1-34	C1-35	C1-36	C1-37	C1-38	C1-39	C1-40	C1-41	C1-42	C1-43	C1-44	C1-45	C1-46	C1-47	C1-48	C1-49	C1-50														
D1-10	D1-11	D1-12	D1-13	D1-14	D1-15	D1-16	D1-17	D1-18	D1-19	D1-20	D1-21	D1-22	D1-23	D1-24	D1-25	D1-26	D1-27	D1-28	D1-29	D1-30	D1-31	D1-32	D1-33	D1-34	D1-35	D1-36	D1-37	D1-38	D1-39	D1-40	D1-41	D1-42	D1-43	D1-44	D1-45	D1-46	D1-47	D1-48	D1-49	D1-50														
E1-10	E1-11	E1-12	E1-13	E1-14	E1-15	E1-16	E1-17	E1-18	E1-19	E1-20	E1-21	E1-22	E1-23	E1-24	E1-25	E1-26	E1-27	E1-28	E1-29	E1-30	E1-31	E1-32	E1-33	E1-34	E1-35	E1-36	E1-37	E1-38	E1-39	E1-40	E1-41	E1-42	E1-43	E1-44	E1-45	E1-46	E1-47	E1-48	E1-49	E1-50														
F1-10	F1-11	F1-12	F1-13	F1-14	F1-15	F1-16	F1-17	F1-18	F1-19	F1-20	F1-21	F1-22	F1-23	F1-24	F1-25	F1-26	F1-27	F1-28	F1-29	F1-30	F1-31	F1-32	F1-33	F1-34	F1-35	F1-36	F1-37	F1-38	F1-39	F1-40	F1-41	F1-42	F1-43	F1-44	F1-45	F1-46	F1-47	F1-48	F1-49	F1-50														
G1-10	G1-11	G1-12	G1-13	G1-14	G1-15	G1-16	G1-17	G1-18	G1-19	G1-20	G1-21	G1-22	G1-23	G1-24	G1-25	G1-26	G1-27	G1-28	G1-29	G1-30	G1-31	G1-32	G1-33	G1-34	G1-35	G1-36	G1-37	G1-38	G1-39	G1-40	G1-41	G1-42	G1-43	G1-44	G1-45	G1-46	G1-47	G1-48	G1-49	G1-50														
H1-10	H1-11	H1-12	H1-13	H1-14	H1-15	H1-16	H1-17	H1-18	H1-19	H1-20	H1-21	H1-22	H1-23	H1-24	H1-25	H1-26	H1-27	H1-28	H1-29	H1-30	H1-31	H1-32	H1-33	H1-34	H1-35	H1-36	H1-37	H1-38	H1-39	H1-40	H1-41	H1-42	H1-43	H1-44	H1-45	H1-46	H1-47	H1-48	H1-49	H1-50														
I1-10	I1-11	I1-12	I1-13	I1-14	I1-15	I1-16	I1-17	I1-18	I1-19	I1-20	I1-21	I1-22	I1-23	I1-24	I1-25	I1-26	I1-27	I1-28	I1-29	I1-30	I1-31	I1-32	I1-33	I1-34	I1-35	I1-36	I1-37	I1-38	I1-39	I1-40	I1-41	I1-42	I1-43	I1-44	I1-45	I1-46	I1-47	I1-48	I1-49	I1-50														
J1-10	J1-11	J1-12	J1-13	J1-14	J1-15	J1-16	J1-17	J1-18	J1-19	J1-20	J1-21	J1-22	J1-23	J1-24	J1-25	J1-26	J1-27	J1-28	J1-29	J1-30	J1-31	J1-32	J1-33	J1-34	J1-35	J1-36	J1-37	J1-38	J1-39	J1-40	J1-41	J1-42	J1-43	J1-44	J1-45	J1-46	J1-47	J1-48	J1-49	J1-50														
K1-10	K1-11	K1-12	K1-13	K1-14	K1-15	K1-16	K1-17	K1-18	K1-19	K1-20	K1-21	K1-22	K1-23	K1-24	K1-25	K1-26	K1-27	K1-28	K1-29	K1-30	K1-31	K1-32	K1-33	K1-34	K1-35	K1-36	K1-37	K1-38	K1-39	K1-40	K1-41	K1-42	K1-43	K1-44	K1-45	K1-46	K1-47	K1-48	K1-49	K1-50														
L1-10	L1-11	L1-12	L1-13	L1-14	L1-15	L1-16	L1-17	L1-18	L1-19	L1-20	L1-21	L1-22	L1-23	L1-24	L1-25	L1-26	L1-27	L1-28	L1-29	L1-30	L1-31	L1-32	L1-33	L1-34	L1-35	L1-36	L1-37	L1-38	L1-39	L1-40	L1-41	L1-42	L1-43	L1-44	L1-45	L1-46	L1-47	L1-48	L1-49	L1-50														
M1-10	M1-11	M1-12	M1-13	M1-14	M1-15	M1-16	M1-17	M1-18	M1-19	M1-20	M1-21	M1-22	M1-23	M1-24	M1-25	M1-26	M1-27	M1-28	M1-29	M1-30	M1-31	M1-32	M1-33	M1-34	M1-35	M1-36	M1-37	M1-38	M1-39	M1-40	M1-41	M1-42	M1-43	M1-44	M1-45	M1-46	M1-47	M1-48	M1-49	M1-50														
N1-10	N1-11	N1-12	N1-13	N1-14	N1-15	N1-16	N1-17	N1-18	N1-19	N1-20	N1-21	N1-22	N1-23	N1-24	N1-25	N1-26	N1-27	N1-28	N1-29	N1-30	N1-31	N1-32	N1-33	N1-34	N1-35	N1-36	N1-37	N1-38	N1-39	N1-40	N1-41	N1-42	N1-43	N1-44	N1-45	N1-46	N1-47	N1-48	N1-49	N1-50														
O1-10	O1-11	O1-12	O1-13	O1-14	O1-15	O1-16	O1-17	O1-18	O1-19	O1-20	O1-21	O1-22	O1-23	O1-24	O1-25	O1-26	O1-27	O1-28	O1-29	O1-30	O1-31	O1-32	O1-33	O1-34	O1-35	O1-36	O1-37	O1-38	O1-39	O1-40	O1-41	O1-42	O1-43	O1-44	O1-45	O1-46	O1-47	O1-48	O1-49	O1-50														
P1-10	P1-11	P1-12	P1-13	P1-14	P1-15	P1-16	P1-17	P1-18	P1-19	P1-20	P1-21	P1-22	P1-23	P1-24	P1-25	P1-26	P1-27	P1-28	P1-29	P1-30	P1-31	P1-32	P1-33	P1-34	P1-35	P1-36	P1-37	P1-38	P1-39	P1-40	P1-41	P1-42	P1-43	P1-44	P1-45	P1-46	P1-47	P1-48	P1-49	P1-50														
Q1-10	Q1-11	Q1-12	Q1-13	Q1-14	Q1-15	Q1-16	Q1-17	Q1-18	Q1-19	Q1-20	Q1-21	Q1-22	Q1-23	Q1-24	Q1-25	Q1-26	Q1-27	Q1-28	Q1-29	Q1-30	Q1-31	Q1-32	Q1-33	Q1-34	Q1-35	Q1-36	Q1-37	Q1-38	Q1-39	Q1-40	Q1-41	Q1-42	Q1-43	Q1-44	Q1-45	Q1-46	Q1-47	Q1-48	Q1-49	Q1-50														
R1-10	R1-11	R1-12	R1-13	R1-14	R1-15	R1-16	R1-17	R1-18	R1-19	R1-20	R1-21	R1-22	R1-23	R1-24	R1-25	R1-26	R1-27	R1-28	R1-29	R1-30	R1-31	R1-32	R1-33	R1-34	R1-35	R1-36	R1-37	R1-38	R1-39	R1-40	R1-41	R1-42	R1-43	R1-44	R1-45	R1-46	R1-47	R1-48	R1-49	R1-50														
S1-10	S1-11	S1-12	S1-13	S1-14	S1-15	S1-16	S1-17	S1-18	S1-19	S1-20	S1-21	S1-22	S1-23	S1-24	S1-25	S1-26	S1-27	S1-28	S1-29	S1-30	S1-31	S1-32	S1-33	S1-34	S1-35	S1-36	S1-37	S1-38	S1-39	S1-40	S1-41	S1-42	S1-43	S1-44	S1-45	S1-46	S1-47	S1-48	S1-49	S1-50														
T1-10	T1-11	T1-12	T1-13	T1-14	T1-15	T1-16	T1-17	T1-18	T1-19	T1-20</																																												



## Test Data in Degrees F - Test Runs 43 Through 49 (Cont)

Temperature No.	Run 44					Run 45					Run 46					Run 47					Run 48					
	7	22	54	62	15	5	10	5	20	50	70	90	110	150	140	16	20	30	40	60	80	35				
Differential Temperature (F)																										
T2-T3	28.21	27.81	27.40	27.36	27.22	27.33	-	-	42.81	33.70	52.57	31.25	29.42	27.89	27.60	27.54	-	-	40.50	35.95	33.81	31.93	26.42	25.32	16.30	
T5-T6	27.54	27.77	27.86	27.90	27.88	28.06	-	-	59.79	32.07	31.25	30.62	29.66	28.06	28.18	28.01	-	-	37.81	30.60	30.35	29.81	27.00	27.10	21.20	
T7-T8	53.80	52.92	52.59	52.22	52.09	52.42	-	-	48.56	39.87	57.96	36.70	33.92	52.92	32.65	32.58	-	-	41.70	43.10	40.70	38.02	31.15	30.80	17.89	
W1	29.0	29.0	29.0	29.0	29.0	29.0	-	-	200	200	200	200	200	200	200	200	-	-	200	200	200	200	200	200	200	
W2	18.3	18.3	18.3	18.3	18.3	18.3	-	-	178	131	141	147	180	181	180	182	182	-	-	110	102	117	145	185	182	182
W5	9.7	9.6	9.6	9.6	9.6	9.4	-	-	95	76	79	81	96	93	92	96	95	-	-	82	79	83	79	93	96	0
W7	10.2	10.2	10.2	10.2	10.2	10.1	-	-	96	79	85	84	100	101	102	102	101	-	-	67	78	75	84	85	104	198
Flow Distribution (Pounds per Hour)																										
P2-T3	-	-	1.58	1.38	1.36	1.38	-	-	1.17	1.12	1.15	1.19	1.38	1.37	1.37	1.37	-	-	-	1.35	1.28	1.23	1.23	1.42	1.40	1.65



Test Data in Degrees F - Differential Pressures -  
Test Runs 50 Through 53

Test Run	Differential Pressure (Inches of Water)			
	Passage AI	Passage AE	Passage BI	Passage BE
50	4.80			
51			4.63	
52		3.65		
53				3.68



## Test Data in Degrees F - Test Runs 54 Through 56

Thermo-couple No.	Elapsed Time (Minutes)														
	Run 54 (1A)														
	10	30	54	70	80	90	100	110	120	130	140	150	160	170	
1	65.4	66.7	66.6	66.2	68.0	68.0	66.6	66.4	65.8	65.8	66.5	66.2	66.3	67.1	
2	64.5	68.1	67.0	65.1	68.0	66.9	64.8	65.7	64.8	64.9	66.7	65.7	65.5	65.1	
3	44.9	46.7	42.6	44.9	47.9	48.7	49.4	49.2	46.5	44.9	43.4	42.5	42.8	46.6	
3A	47.8	47.8	44.9	44.3	49.2	49.4	50.2	50.9	49.9	47.4	45.6	43.6	43.4	46.7	
4	49.1	46.1	42.7	44.4	47.5	51.1	51.9	52.0	50.5	48.8	44.0	43.2	43.6	49.0	
5	66.9	67.4	66.5	65.9	68.3	70.6	70.0	69.4	66.8	67.3	66.2	66.0	65.7	69.6	
6	38.7	48.3	43.6	48.5	55.6	53.1	50.4	52.5	50.2	47.7	45.7	43.8	45.1	53.6	
7	68.1	68.0	67.6	66.6	69.2	70.0	68.6	68.5	66.7	66.8	67.3	66.7	66.7	68.4	
8	51.8	44.4	39.9	38.4	39.6	43.0	45.9	44.2	41.7	39.8	39.2	38.0	35.5	37.2	
A1-10	59.2	62.5	60.7	63.6	66.3	65.0	63.0	62.9	63.1	61.5	61.3	60.2	61.2	64.3	
A1-11	17.2	43.9	31.5	43.2	53.1	50.0	45.3	46.9	48.0	43.0	37.3	33.6	41.0	53.4	
A1-12	28.4	46.6	35.7	48.1	55.4	52.1	47.7	48.5	49.7	44.1	38.9	36.7	43.1	54.2	
A1-13	23.5	39.9	30.5	42.5	44.1	39.4	39.2	41.9	36.6	34.4	32.4	32.1	35.9	46.3	
A1-28	31.8	53.0	42.6	51.3	59.8	58.1	54.0	55.3	55.8	52.0	47.1	44.7	50.5	60.5	
A1-30	22.8	46.5	34.6	45.8	56.1	53.4	48.2	48.9	49.8	44.8	39.1	35.6	41.9	54.7	
A1-31	15.1	38.2	28.2	39.3	46.7	42.9	39.8	42.3	38.7	35.2	31.8	28.7	33.9	46.7	
A2-10	61.0	63.3	62.0	64.1	66.5	65.4	63.5	63.9	63.2	62.1	62.6	61.6	62.2	64.2	
A2-11	46.1	54.8	50.4	57.2	62.2	60.2	58.5	59.9	58.2	55.4	53.3	51.0	52.7	59.9	
A2-12	48.4	58.4	52.8	59.7	63.7	62.2	61.2	62.5	61.1	59.1	56.7	54.8	58.0	65.0	
A2-13	40.9	50.9	43.7	51.9	53.9	48.9	48.2	51.8	47.0	44.8	44.6	44.6	47.2	54.3	
A2-28	53.7	61.7	56.3	61.5	66.2	64.2	62.1	63.7	63.5	61.1	59.3	58.1	61.2	66.4	
A2-30	49.0	57.5	52.9	58.9	64.0	62.2	60.3	61.6	60.3	57.9	55.7	53.9	55.9	62.7	
A2-31	43.9	56.3	48.0	57.2	60.6	56.0	54.9	54.2	51.7	50.3	49.4	49.4	52.8	61.5	
B1-9	61.6	55.1	52.2	52.0	53.9	57.0	57.7	55.9	54.2	53.1	52.3	51.8	51.8	52.7	
B2-10	62.8	61.5	60.0	59.9	61.3	62.2	62.8	62.4	61.5	60.0	59.2	60.0	60.2	61.1	
B2-11	56.7	41.3	30.6	29.6	32.8	40.3	46.1	43.6	38.2	33.6	30.5	28.1	28.1	29.2	
B2-12	56.6	44.5	35.5	35.4	37.8	42.7	48.0	47.6	42.5	38.4	35.9	34.3	34.3	35.5	
B2-13	45.3	34.6	31.8	32.8	35.6	38.6	38.4	35.0	32.4	31.5	31.1	31.2	32.0	33.4	
B2-14	61.7	60.4	59.5	60.0	61.0	61.8	61.4	60.8	60.3	59.9	60.0	59.9	60.2	60.5	
B2-15	50.9	41.5	38.0	39.5	42.4	45.2	49.9	42.0	39.6	38.1	37.5	38.0	39.8	39.8	
B2-16	48.4	36.1	31.4	31.6	34.8	38.9	40.1	36.9	33.4	31.3	30.0	29.9	30.4	31.8	
B2-17	47.9	38.9	36.9	37.0	39.8	42.3	42.8	39.3	38.6	37.6	35.9	36.8	37.6	37.8	
B2-18	51.7	39.4	32.8	33.0	36.9	40.9	42.9	40.7	37.0	34.1	32.3	31.4	31.8	33.6	
B2-19	48.6	41.8	40.2	41.2	43.6	45.5	44.6	41.9	40.2	39.7	39.6	39.7	40.2	41.9	
B1-20	50.7	45.7	44.8	45.3	47.2	48.8	48.1	46.2	44.8	44.5	44.6	44.8	44.9	46.1	
B1-21	103.0	37.6	-2.1	-6.1	15.2	65.6	82.5	51.9	27.6	9.6	-3.5	-11.3	-12.4	-9.4	
B1-22	46.5	16.9	-11.3	-19.9	-10.0	20.9	36.1	23.2	9.8	-1.9	-11.8	-21.1	-25.0	-26.2	
B1-23	20.9	10.5	-16.4	-27.9	-30.4	-16.9	13.6	19.4	8.3	-2.5	-12.9	-23.4	-28.8	-31.4	
B1-24	59.7	33.8	1.3	-6.6	-6.3	13.2	52.7	50.1	28.9	13.2	2.1	-7.2	-10.3	-9.1	
B1-25	64.6	32.0	10.2	6.4	11.1	27.3	44.4	40.8	27.3	17.3	10.3	5.1	4.2	5.3	
B1-26	108.8	44.0	6.8	0.4	12.6	60.0	89.8	64.9	37.5	19.5	7.1	-2.1	-4.3	-1.1	
B1-27	116.0	52.4	6.5	-4.3	4.9	53.2	91.9	75.0	45.3	23.5	8.5	-4.5	-9.0	-8.5	
B1-28	60.9	47.3	38.3	37.4	40.1	47.2	51.7	49.5	44.1	41.1	38.5	36.0	35.8	36.6	
B1-29	60.0	48.1	38.5	38.4	39.4	43.6	51.6	53.2	46.7	42.0	39.5	37.8	37.3	37.8	
B1-30	57.5	44.5	34.6	33.8	36.6	42.1	47.8	47.1	41.9	37.9	35.1	33.1	33.1	33.7	
B1-31	49.8	34.3	26.9	27.2	30.6	35.9	38.6	36.0	31.0	28.1	26.9	25.3	25.4	27.1	
B1-32	56.2	35.2	19.5	16.8	21.6	32.2	42.4	39.2	31.6	24.8	18.8	15.7	15.5	16.9	
B1-33	58.7	33.4	15.4	12.4	17.4	29.9	42.5	39.4	29.2	20.7	14.7	10.4	9.6	12.1	
B1-34	59.2	35.2	22.1	20.4	25.7	39.3	47.1	39.4	30.5	24.6	20.9	18.2	17.7	20.5	
B1-35	63.8	33.8	6.8	1.0	4.7	32.8	42.1	39.2	25.7	14.3	6.6	-0.9	-3.6	-2.9	
B1-36	66.4	37.4	9.4	2.9	4.9	19.0	50.0	52.2	34.2	20.4	10.2	2.9	0.9	1.8	
B1-37	46.2	34.2	21.1	18.8	20.0	26.2	40.7	41.1	31.5	25.0	21.1	17.9	17.5	18.2	
B2-10	63.9	62.6	61.5	61.7	62.7	63.8	63.9	63.2	62.5	61.8	62.1	61.6	61.5	62.1	
B2-11	53.8	48.2	42.1	40.5	41.2	44.0	47.7	48.1	45.4	43.2	41.9	40.3	39.6	39.6	
B2-12	56.1	47.6	40.7	39.0	39.6	43.7	47.4	47.1	43.8	41.4	40.1	38.4	37.0	37.7	
B2-13	50.2	41.4	39.8	40.5	42.3	45.2	45.3	42.0	39.8	39.4	38.4	39.7	40.2	41.1	
B2-28	61.1	57.2	52.0	47.3	52.3	55.8	58.5	53.6	54.6	53.2	48.3	47.6	48.9	48.3	
B2-30	56.2	49.7	43.4	41.2	42.4	45.7	49.4	48.8	46.7	44.3	42.0	40.8	40.3	40.5	
B2-31	53.1	42.0	37.3	36.5	38.7	43.1	45.5	42.1	39.0	37.4	36.1	35.4	35.7	36.5	
83	52.8	44.5	38.1	36.3	38.4	42.5	45.9	44.2	42.2	39.7	37.3	35.1	35.4	35.8	
84	36.8	47.8	41.9	49.0	55.3	54.4	51.1	51.7	51.8	48.3	45.0	42.5	45.2	54.3	
Differential Temperatures (F)															
T2-T3	20.30	17.62	21.03	14.07	17.23	16.88	15.97	15.65	17.94	20.18	22.04	22.42	21.52	18.91	
T5-T6	27.17	18.21	21.64	14.73	12.67	15.68	16.97	14.64	16.48	18.93	21.24	22.35	19.93	13.57	
T7-T8	14.41	22.37	25.76	28.26	27.55	23.86	20.44	22.18	24.32	26.02	27.41	28.22	28.83	28.15	
Flow Distribution (Pounds per Hour)															
W1	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
W2	183	180	177	181	181	183	180	183	181	180	178	181	180	185	
W5	63	90	90	95	95	97	90	90	96	96	92	91	92	95	
W7	104	-	94	100	91	99	102	101	95	95	100	96	100	100	
Pressures (Pounds per Square Inch)															
P2-P3	1.50	1.49	1.50	1.49	1.45	1.45	1.45	1.45	1.46	1.49	1.50	1.50	1.51	1.50	



## Test Data in Degrees F - Test Runs 54 Through 56 (Cont)

Thermo-couple No.	Elapsed Time (Minutes)													
	Run 54 (1A)													
	180	190	200	210	220	230	240	250	260	270	280	290	300	310
1	67.0	67.7	66.6	66.4	66.8	66.5	66.4	67.2	67.4	68.3	67.4	67.6	66.4	65.5
2	65.8	66.9	65.0	66.1	67.3	65.5	66.9	67.5	66.6	67.7	68.2	67.1	65.9	64.4
3	48.9	49.7	48.3	47.0	44.1	42.5	42.1	42.7	46.3	48.2	51.3	50.5	47.7	46.9
3A	49.8	50.4	50.1	49.3	47.1	44.8	43.4	44.3	47.2	50.0	51.3	51.7	49.9	47.1
4	51.8	51.6	52.0	48.5	44.9	46.1	42.3	41.8	47.3	49.9	49.6	52.3	50.0	46.1
5	69.4	70.3	69.7	66.1	66.5	69.8	66.0	67.4	69.8	69.8	66.0	69.7	67.2	65.3
6	53.3	51.2	50.4	48.1	45.7	44.3	42.6	44.0	51.6	54.3	51.3	50.1	47.5	45.4
7	68.6	69.8	68.4	66.7	67.4	68.6	66.5	68.3	69.3	70.0	67.5	69.6	67.2	66.1
8	40.2	47.1	43.0	43.0	41.5	39.6	39.1	41.8	39.8	40.8	46.7	49.5	44.4	41.6
A1-10	64.5	53.4	63.0	62.0	61.2	60.1	60.1	61.2	64.8	65.8	65.5	63.6	61.0	61.0
A1-11	51.7	45.9	47.2	44.4	37.9	32.3	29.6	30.1	43.5	52.5	50.9	44.4	41.2	37.2
A1-12	51.7	46.5	47.4	44.2	38.6	35.0	32.9	35.4	49.2	54.7	51.8	46.8	43.7	39.4
A1-13	43.3	39.0	40.2	35.4	32.3	30.5	31.1	34.6	44.8	43.0	39.1	36.7	35.2	33.0
A1-28	59.0	54.9	56.0	52.7	47.6	44.5	41.3	42.3	53.0	59.9	56.6	53.1	50.8	46.8
A1-30	52.9	48.6	48.6	45.1	39.3	35.4	31.6	33.4	47.9	55.4	52.0	47.4	43.6	38.8
A1-31	44.7	41.0	40.8	36.5	32.0	28.8	25.7	28.8	41.4	46.1	42.5	38.8	34.5	31.3
A2-10	64.5	64.4	63.7	62.8	62.2	61.8	61.3	62.7	65.8	67.1	65.3	64.7	62.7	61.5
A2-11	59.2	57.4	57.4	54.6	52.3	49.9	48.8	50.3	58.0	60.3	59.4	57.1	54.0	51.9
A2-12	63.2	60.6	61.3	58.7	55.9	53.2	52.5	53.7	60.8	63.4	63.1	60.2	57.9	56.0
A2-13	51.5	49.0	49.9	46.1	44.5	44.2	44.3	47.2	54.9	52.7	48.9	47.4	45.9	44.8
A2-28	64.7	63.0	63.3	61.1	58.8	57.4	56.1	57.0	63.2	66.5	64.3	62.4	60.8	58.5
A2-30	61.8	59.7	60.0	57.2	54.9	53.1	51.8	53.1	60.4	62.9	61.0	59.1	56.9	54.5
A2-31	58.1	55.1	56.2	52.3	49.9	48.5	48.0	50.9	60.2	59.7	56.0	53.8	51.9	50.0
B1-9	55.8	58.0	56.8	55.0	53.7	53.0	53.0	54.2	54.1	55.8	59.0	58.6	55.8	53.6
B1-10	62.7	62.9	63.3	61.3	60.4	60.6	60.5	60.6	61.5	62.7	64.0	63.0	62.2	60.4
B1-11	36.8	43.1	42.6	40.7	36.1	32.5	31.3	34.8	34.4	36.9	46.6	47.1	40.9	35.5
B1-12	42.4	45.7	46.4	43.9	39.6	36.6	36.0	38.9	38.9	42.2	51.7	49.8	44.2	39.6
B1-13	39.8	42.2	35.6	33.4	32.0	31.5	32.4	35.6	35.0	37.5	44.9	41.5	35.7	33.1
B1-14	62.3	62.1	61.5	60.4	60.1	60.1	60.2	60.7	61.2	62.8	63.1	62.1	61.0	59.9
B1-15	47.4	47.3	42.2	40.2	38.9	38.0	39.0	41.9	41.5	44.8	52.3	47.3	42.2	39.7
B1-16	38.5	43.0	37.1	34.3	32.7	31.6	31.5	34.8	34.5	36.8	44.9	43.4	37.1	33.2
B1-17	42.7	44.9	39.6	38.9	37.4	36.9	38.6	40.4	37.8	41.2	46.5	44.9	40.2	38.4
B1-18	42.3	44.5	39.9	38.0	35.3	33.3	33.4	37.2	36.8	40.1	49.9	46.1	39.8	35.5
B1-19	47.6	46.9	42.5	40.9	39.8	39.7	40.9	42.9	42.6	45.0	50.6	46.2	42.3	40.7
B1-20	50.0	50.1	46.7	45.4	44.8	44.7	45.4	47.0	46.5	48.5	52.0	49.4	46.5	45.1
B1-21	11.7	53.4	65.8	41.1	18.3	3.4	4.5	7.2	5.1	18.6	54.0	53.1	29.8	11.6
B1-22	-15.1	11.4	24.0	13.7	2.2	-7.1	-9.1	-10.4	-13.5	-7.4	13.6	15.0	4.7	-5.4
B1-23	-25.8	5.8	8.6	0	-8.8	-17.2	-24.1	-20.4	-21.4	-13.8	18.8	17.4	7.0	-3.6
B1-24	1.5	48.0	44.1	24.2	9.8	-0.3	-6.4	3.4	2.6	14.8	61.2	47.3	27.7	13.4
B1-25	14.0	29.3	39.5	34.9	23.3	14.7	10.3	14.8	14.7	16.6	31.5	41.1	31.1	20.1
B1-26	12.7	51.9	81.4	55.4	30.5	15.1	9.7	17.2	13.0	17.0	46.0	66.3	41.6	22.8
B1-27	3.6	43.8	82.6	64.0	37.1	18.8	8.7	13.7	10.4	11.5	39.0	67.2	46.5	25.5
B1-28	43.1	49.0	48.3	46.2	42.8	40.5	38.5	41.1	41.4	43.0	50.2	51.7	47.1	41.3
B1-29	44.2	51.0	50.8	45.9	42.0	39.5	37.8	41.2	42.3	45.7	56.9	54.8	48.3	42.2
B1-30	40.5	41.0	45.9	43.6	39.9	36.6	35.0	38.4	38.6	41.1	50.3	50.5	44.4	39.0
B1-31	35.3	41.0	35.1	32.4	30.1	28.2	27.3	31.2	30.9	33.8	44.3	42.4	35.5	30.3
B1-32	25.2	33.6	38.2	35.9	28.2	21.7	20.0	24.6	23.4	27.3	40.0	41.9	33.5	27.2
B1-33	20.6	31.2	37.8	34.4	25.0	18.2	15.9	19.5	18.5	21.9	35.7	40.2	31.7	23.5
B1-34	27.5	39.8	41.9	34.5	27.1	23.1	22.9	25.5	24.7	28.3	40.4	43.5	34.2	27.3
B1-35	6.4	23.1	34.6	30.8	19.7	11.4	6.5	8.4	7.6	10.0	25.7	34.9	26.7	15.7
B1-36	11.1	42.1	44.0	29.6	17.7	9.1	4.3	12.5	12.1	20.4	54.3	51.2	33.0	20.4
B1-37	23.3	39.2	39.6	30.4	24.2	20.4	18.5	23.2	23.1	27.3	44.5	42.0	32.0	25.7
B2-10	63.5	64.3	63.6	62.6	61.9	62.0	61.9	62.6	62.5	63.7	64.5	64.3	63.1	61.8
B2-11	42.3	46.4	46.2	45.5	43.9	42.5	41.5	42.6	42.1	43.4	47.2	48.9	46.3	43.5
B2-12	40.0	46.0	44.8	44.3	42.8	40.7	39.7	40.9	40.8	41.3	45.8	49.2	45.7	42.2
B2-13	44.8	49.1	42.6	40.6	39.7	39.7	40.1	43.0	42.2	43.7	48.5	47.9	42.5	40.4
B2-28	48.8	53.6	56.2	55.5	53.8	49.0	48.9	53.0	52.3	53.3	57.2	59.7	54.6	52.2
B2-30	42.5	47.1	47.6	46.9	44.9	43.4	42.4	44.0	43.2	44.3	48.2	50.6	47.2	44.7
B2-31	39.8	47.0	42.1	39.9	38.3	36.8	36.6	39.9	39.1	40.2	46.3	48.3	41.7	38.4
83	38.6	43.9	44.1	42.5	40.7	37.7	36.5	39.1	39.6	39.8	45.7	48.5	44.2	39.8
84	52.8	49.5	51.7	48.7	44.8	41.6	40.3	41.9	50.4	54.7	53.0	50.0	47.5	44.4
Differential Temperatures (F)														
T2-T3	17.26	15.95	17.07	18.58	20.69	22.51	23.06	21.93	18.45	17.37	14.72	15.43	18.50	19.81
T5-T6	14.86	17.44	16.48	18.48	21.09	22.81	23.55	22.82	15.52	13.89	15.85	18.15	19.46	20.40
T7-T8	25.32	20.39	23.08	23.65	25.26	26.80	27.00	25.45	26.82	26.03	20.13	18.51	22.70	24.22
Flow Distribution (Pounds per Hour)														
W1	200	200	200	200	200	200	200	200	200	200	200	200	200	200
W2	181	180	181	181	180	178	182	184	182	181	181	179	175	
W5	95	90	93	91	95	93	88	94	96	95	95	90	93	
W7	99	103	96	103	100	101	103	102	95	100	102	95	100	
Pressures (Pounds per Square Inch)														
P2-P3	1.41	1.43	1.45	1.47	1.45	1.51	1.51	1.51	1.45	1.45	1.43	1.45	1.50	



## Test Data in Degrees F - Test Runs 54 Through 56 (Cont)

Thermo-couple No.	Elapsed Time (Minutes)														
	Run 54 (1A)														
	320	330	340	350	360	370	380	390	400	410	420	430	440	450	
1	64.5	65.7	67.6	68.1	68.2	67.0	66.6	66.2	66.6	66.2	66.8	67.7	67.4		
2	64.8	64.1	68.0	66.6	69.3	65.4	66.9	65.3	65.7	66.4	65.0	65.8	66.1	66.4	
3	42.5	42.0	43.4	47.6	50.0	51.6	50.8	47.0	45.5	43.9	43.4	47.5	48.6	49.7	
3A	44.6	42.1	43.6	47.6	51.6	52.2	52.1	48.9	47.2	46.8	45.4	48.2	49.9	50.9	
4	43.6	42.7	41.9	48.1	50.5	53.5	51.0	50.0	46.6	46.1	46.6	48.8	51.6	51.1	
5	64.5	65.0	66.3	71.4	67.8	70.2	65.9	67.4	65.9	68.2	69.6	69.6	70.8	67.9	
6	43.3	41.8	37.3	51.7	56.3	53.6	48.6	47.3	48.2	48.1	47.1	48.7	52.4	53.8	
7	65.1	65.1	67.6	70.1	69.1	69.4	66.6	67.1	66.2	68.5	68.5	69.1	69.4	67.5	
8	39.3	38.4	43.2	41.6	42.9	47.5	48.6	42.7	39.7	38.0	39.4	45.2	42.0	41.9	
A1-10	59.3	58.4	61.7	65.1	66.4	63.4	62.3	62.6	61.2	60.9	60.0	61.7	64.5	65.3	
A1-11	32.1	28.1	28.9	45.3	56.3	51.3	44.6	42.1	48.0	46.5	40.9	41.9	50.8	56.8	
A1-12	35.7	33.1	35.3	50.8	57.7	50.9	44.9	45.7	48.5	44.5	40.7	43.6	52.8	57.9	
A1-13	31.7	30.8	33.0	45.1	45.3	39.8	35.9	34.1	34.4	33.7	33.7	39.7	42.9	43.3	
A1-28	43.0	39.8	40.7	55.0	62.0	58.6	53.2	51.6	55.8	54.8	51.3	51.8	59.0	62.5	
A1-30	34.4	31.1	31.7	49.4	57.1	53.7	-	44.8	48.8	47.4	43.4	44.3	52.9	57.8	
A1-31	27.8	24.9	26.3	41.9	47.7	44.4	37.0	34.4	36.9	37.7	35.2	38.8	44.2	46.7	
A2-10	60.1	59.5	62.4	65.9	66.4	64.4	62.8	62.9	61.9	62.2	61.7	63.0	65.2	65.0	
A2-11	49.4	47.4	49.7	58.5	62.8	59.4	56.2	56.4	56.1	54.4	52.2	54.7	57.6	58.4	
A2-12	53.1	51.0	53.2	61.1	66.1	63.2	60.6	58.8	60.4	59.8	57.3	59.6	61.3	61.5	
A2-13	43.8	43.0	45.7	55.3	54.4	49.3	46.2	45.4	45.3	44.8	44.9	49.5	52.2	51.0	
A2-28	56.2	54.6	56.6	64.1	68.3	64.9	61.9	61.8	63.8	62.6	60.6	62.0	65.7	66.8	
A2-30	52.3	50.5	52.2	61.0	64.8	61.5	58.5	58.5	59.0	57.7	55.9	57.9	60.9	61.5	
A2-31	48.2	46.9	49.2	60.7	61.9	56.6	53.1	52.3	53.0	52.0	50.9	54.7	58.3	57.6	
B1-9	51.9	51.9	55.8	55.7	56.7	58.3	57.9	54.5	52.8	51.9	53.9	56.5	55.4	55.6	
B1-10	59.5	59.1	62.0	62.8	63.8	62.5	62.4	61.2	60.6	59.7	60.7	61.3	62.1	62.8	
B1-11	31.6	32.0	37.4	38.2	39.9	46.5	44.7	37.1	32.4	28.9	34.9	42.1	38.0	37.9	
B1-12	36.1	37.5	40.8	42.4	44.7	48.9	45.9	40.1	36.7	34.7	40.3	43.9	41.2	41.9	
B1-13	31.8	33.9	38.1	36.1	38.2	45.5	42.6	35.2	32.7	32.0	35.2	40.7	36.0	36.7	
B1-14	58.7	58.5	61.2	62.1	62.8	62.6	61.4	60.3	59.8	59.7	60.7	60.9	61.6	61.8	
B1-15	38.0	41.2	43.8	42.9	46.0	52.1	47.7	41.1	39.0	38.1	45.2	46.1	42.3	43.9	
B1-16	31.2	32.4	37.9	36.4	38.1	45.6	43.4	36.0	32.3	30.9	35.9	41.2	36.6	36.6	
B1-17	36.7	38.1	43.0	39.8	42.3	47.6	45.5	39.8	38.0	37.4	39.8	44.1	39.6	40.7	
B1-18	33.2	35.9	39.8	39.2	42.0	49.4	45.2	37.6	33.9	32.5	40.0	43.1	38.9	39.6	
B1-19	39.8	42.2	44.2	43.6	46.0	50.5	47.1	41.7	40.6	40.0	45.3	45.5	43.0	44.6	
B1-20	44.1	45.3	48.0	47.4	49.2	52.3	50.1	46.0	45.2	44.9	47.9	48.6	46.9	48.0	
B1-21	-2.0	-4.7	26.5	25.3	20.0	22.3	20.6	6.1	-4.7	-12.1	17.8	17.8	12.5	22.3	
B1-22	-14.4	-19.2	-2.0	-4.1	-5.8	-5.2	-6.4	-14.5	-21.5	-27.5	-10.2	-10.8	-12.9	-5.7	
B1-23	-13.4	-22.3	-7.4	-9.0	-8.4	-10.9	-4.0	-11.4	-18.6	-26.4	-23.1	-14.2	-16.0	-10.3	
B1-24	-2.0	-5.2	22.6	16.7	16.8	13.7	23.3	10.5	0.4	-7.8	0.7	15.1	9.4	15.8	
B1-25	12.0	19.7	15.9	23.4	23.0	29.7	30.5	21.2	12.6	6.6	13.0	28.0	22.2	19.7	
B1-26	5.0	2.0	23.2	34.9	26.4	28.9	40.0	22.1	9.1	-1.3	18.1	37.7	25.7	23.4	
B1-27	10.5	-1.0	14.7	33.3	25.6	23.0	35.0	21.1	7.5	-5.0	10.5	33.8	24.2	21.4	
B1-28	38.0	38.2	43.4	44.7	46.0	49.3	49.0	43.2	39.3	36.2	41.7	40.5	44.2	44.4	
B1-29	39.2	39.3	44.4	46.3	48.1	48.8	48.2	43.3	39.4	37.4	42.6	45.4	44.4	45.1	
B1-30	35.7	35.7	40.3	42.5	43.7	48.6	46.5	40.4	36.1	33.9	39.6	44.6	41.4	41.2	
B1-31	27.4	29.2	35.1	33.3	36.1	44.0	42.0	33.3	28.9	26.5	33.1	39.3	33.8	33.9	
B1-32	26.2	20.0	29.0	30.1	39.0	35.7	27.5	21.0	17.7	23.9	34.3	28.9	27.3		
B1-33	16.3	15.0	21.7	25.4	26.8	34.7	33.2	24.1	17.0	12.3	18.1	30.5	24.8	24.0	
B1-34	21.2	21.2	31.2	30.7	30.7	35.9	37.2	28.2	22.7	18.9	25.4	33.2	28.8	29.7	
B1-35	7.3	3.5	11.3	15.8	16.9	22.4	24.1	13.9	5.8	-2.3	5.7	17.2	13.6	14.3	
B1-36	10.4	5.8	25.1	23.0	24.0	24.4	30.9	19.0	9.3	2.7	7.1	23.0	18.2	20.0	
B1-37	21.0	19.1	29.9	28.7	29.0	29.8	33.1	26.3	21.4	18.3	20.6	29.5	26.4	26.7	
B2-10	60.0	60.2	63.4	63.8	64.5	64.1	63.4	62.1	61.6	61.5	61.9	62.9	63.3	63.5	
B2-11	41.3	40.1	43.9	43.5	44.8	47.0	47.0	43.7	41.6	40.0	40.8	44.9	43.5	43.5	
B2-12	40.1	38.0	42.4	42.3	43.1	46.3	47.0	42.9	40.1	38.0	38.5	44.6	42.4	42.3	
B2-13	39.3	39.6	44.9	43.1	44.0	49.7	48.2	42.4	40.3	40.0	42.2	47.4	42.9	43.0	
B2-18	48.2	46.7	51.3	55.4	53.0	55.7	54.3	53.0	48.1	50.7	50.9	56.6	54.5	50.9	
B2-30	41.0	40.7	44.8	45.2	45.1	48.8	48.7	44.9	42.1	40.9	41.2	46.7	44.8	44.0	
B2-31	36.4	35.3	42.1	40.7	41.2	47.3	47.3	47.0	40.6	37.1	35.9	45.7	40.6	40.1	
S-3	37.6	35.1	39.8	41.1	42.4	44.0	45.9	41.6	37.9	36.7	38.5	43.6	41.5	40.5	
S-4	41.0	38.9	40.0	51.0	57.0	52.0	48.5	48.5	49.4	49.4	46.7	48.3	53.2	54.9	
Differential Temperatures (F)															
12.73	20.89	22.71	22.02	18.08	15.31	13.77	15.81	18.25	19.64	20.59	20.31	17.32	17.42	17.01	
12.74	21.49	23.14	23.82	15.09	11.72	14.69	18.50	14.02	18.24	18.28	19.93	18.34	14.98	13.85	
12.75	25.55	26.28	24.52	26.37	25.11	19.24	19.03	24.37	26.34	27.79	26.37	21.30	25.48	25.31	
Flow Distribution (Pounds per Hour)															
1	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
2	180	180	181	185	181	184	184	180	181	182	178	182	183	181	
3	12	40	93	98	91	97	92	95	91	93	95	95	95	95	
4	100	95	104	103	100	99	99	100	97	95	95	101	98	102	
Pressures (Pounds per Square Inch)															
12.76	1.55	1.57	1.49	1.40	1.41	1.43	1.45	1.45	1.50	1.50	1.50	1.50	1.47	1.45	1.44



## Test Data in Degrees F - Test Runs 54 Through 56 (Cont)

Thermocouple No.	Elapsed Time (Minutes)														
	Run 54 (1A)				Run 55 (1B)				Run 56 (1C)						
	460	470	480	2	19	10	30	50	70	90	112	130	150	170	180
3A	67.5	66.6	66.1	65.9	70.9	71.2	70.2	71.7	72.4	72.6	71.9	72.0	71.4	70.8	71.4
4	68.0	64.4	65.3	64.8	70.0	70.9	69.6	72.2	72.8	72.6	70.3	71.2	69.6	69.6	69.9
5	51.4	50.7	52.5	51.4	49.5	50.4	48.4	46.5	52.8	53.7	49.4	46.4	48.4	53.7	52.3
6	49.8	54.5	55.2	54.9	52.3	50.1	51.3	46.3	50.0	53.1	52.7	48.6	50.4	54.2	54.2
7	66.0	69.4	69.0	69.3	73.1	71.0	71.1	71.2	71.1	72.5	74.8	74.3	74.2	72.2	74.1
8	51.5	50.3	53.4	53.3	47.1	51.8	50.6	50.4	57.6	55.7	52.5	48.9	55.0	54.5	53.7
9	67.4	68.5	68.0	68.1	72.0	71.8	70.6	72.3	72.6	73.4	73.4	73.9	73.0	71.3	73.0
10	47.4	52.3	47.3	46.1	52.3	47.5	43.0	41.8	45.8	50.2	44.4	42.5	41.2	48.7	48.8
11	64.1	64.1	64.6	63.5	64.7	68.4	64.8	66.1	69.7	68.1	66.3	65.1	68.5	66.8	66.6
12	53.8	49.7	50.5	50.3	41.8	51.9	44.8	43.4	57.3	50.7	48.2	37.8	54.0	51.2	49.0
13	52.5	50.2	53.0	52.3	43.5	55.0	45.2	46.0	57.6	51.5	48.0	40.0	56.4	51.1	50.1
14	39.7	41.4	44.6	43.2	33.0	42.2	38.1	42.5	44.6	45.4	38.4	35.7	47.0	43.0	43.0
15	59.4	57.5	57.6	52.5	59.6	54.2	53.1	62.9	59.0	57.9	49.8	62.4	59.3	58.9	58.9
16	53.4	50.8	52.8	52.7	44.4	54.6	46.5	45.3	58.1	52.3	50.3	40.9	56.3	52.0	51.3
17	43.8	42.9	45.2	44.6	35.0	43.7	37.9	39.6	48.3	46.1	40.6	33.7	47.0	43.6	43.6
18	64.0	64.1	64.9	64.3	66.3	68.3	65.6	67.1	69.6	69.2	67.5	66.8	68.8	67.0	67.6
19	56.2	56.3	59.4	58.0	53.6	61.1	56.5	57.7	65.0	64.0	59.3	55.1	63.2	61.0	61.0
20	59.8	59.9	61.1	59.9	56.8	63.0	60.4	61.9	68.1	67.5	63.4	58.7	67.5	64.9	64.6
21	48.0	49.3	52.9	51.8	45.0	52.0	48.7	52.8	54.0	55.6	49.6	48.8	56.6	52.1	52.9
22	64.3	63.6	64.2	63.8	62.7	66.6	63.6	64.3	69.5	68.3	66.4	62.7	69.5	66.5	66.6
23	58.9	59.0	61.7	60.6	57.0	62.9	59.6	60.4	66.6	65.9	62.2	58.4	65.8	63.4	63.6
24	54.6	55.7	59.0	57.5	51.2	58.5	54.4	58.1	61.6	62.7	56.3	53.5	63.8	58.8	59.7
25	59.1	60.8	57.6	56.8	61.4	58.9	56.6	56.1	59.8	61.4	58.0	56.5	56.4	61.4	60.9
26	63.8	64.6	62.8	62.2	64.9	64.7	64.4	64.2	65.9	67.0	65.9	65.1	65.2	67.4	66.7
27	48.1	53.2	48.0	47.2	52.5	44.9	35.5	32.3	40.7	49.2	37.9	32.5	31.9	46.1	45.6
28	52.0	54.9	49.8	49.5	51.4	45.8	38.9	37.7	44.0	52.5	42.3	38.2	38.3	51.1	49.5
29	45.1	45.9	38.9	38.0	41.9	37.5	34.9	35.7	41.3	40.0	35.6	34.8	36.4	46.8	41.2
30	62.9	62.9	61.4	61.2	64.4	64.1	63.8	64.0	65.7	65.9	65.0	64.9	64.8	66.2	65.2
31	52.3	51.2	45.4	45.4	48.1	44.2	41.3	41.9	47.9	47.2	42.6	41.3	43.0	53.3	47.2
32	45.3	48.3	41.1	40.1	44.4	39.0	34.7	33.8	40.5	42.0	36.1	34.1	34.9	46.3	42.5
33	49.0	48.2	41.7	41.0	45.9	43.2	40.6	41.4	46.2	44.6	40.9	40.2	42.0	50.7	45.3
34	50.3	51.2	44.7	44.4	47.3	41.9	36.2	35.7	43.1	46.0	38.4	35.3	36.2	50.2	44.8
35	50.8	49.4	44.3	44.2	47.0	44.5	43.4	44.2	48.7	46.8	44.0	43.6	45.1	52.6	47.2
36	52.2	51.9	47.6	47.4	50.6	49.0	48.4	49.1	52.1	50.9	49.1	49.0	49.9	54.6	51.2
37	68.7	64.9	45.2	49.2	65.3	36.9	3.8	-7.4	41.3	64.2	13.1	-7.1	-9.0	38.4	71.8
38	24.5	26.1	21.6	26.6	40.0	24.2	-0.1	-15.4	12.9	32.7	5.1	-12.7	-21.5	3.9	27.3
39	19.4	27.3	18.2	14.8	10.1	-0.3	-16.4	-29.5	-20.3	21.8	0.2	-17.1	-25.8	14.5	15.4
40	58.5	60.1	38.8	32.8	27.9	13.9	-3.6	-12.8	7.0	51.7	13.1	-3.8	-5.9	55.1	46.3
41	37.3	53.7	49.9	49.1	53.7	36.6	16.1	8.2	22.1	48.2	21.5	10.1	7.5	27.6	38.2
42	67.8	90.4	87.3	86.5	85.8	51.3	15.8	2.0	41.7	80.9	24.6	4.1	0.8	39.5	77.2
43	62.8	94.0	95.7	96.1	99.6	64.1	20.4	-0.4	35.0	91.0	31.6	4.9	-4.3	30.7	74.7
44	52.2	57.4	51.9	51.3	56.8	51.2	46.4	39.7	47.1	54.9	45.8	41.0	39.8	50.0	51.9
45	56.2	59.8	52.9	52.2	51.1	46.8	41.3	39.3	44.8	57.9	46.3	41.9	41.2	55.9	55.0
46	50.3	55.2	50.4	49.9	53.0	46.4	38.7	36.6	43.3	52.8	42.1	37.6	36.4	49.9	48.8
47	44.7	48.6	40.6	39.8	44.0	37.8	30.7	29.4	37.2	40.8	32.8	29.6	30.0	44.2	40.5
48	41.9	50.4	45.8	45.2	50.6	37.9	23.9	20.2	30.8	45.8	27.8	20.3	19.3	37.5	39.0
49	40.1	50.8	45.9	45.2	50.6	36.7	20.1	14.9	26.7	45.2	24.5	15.0	14.0	33.2	37.9
50	44.3	50.2	39.8	38.3	48.2	37.9	26.3	22.4	36.0	45.0	28.7	22.3	22.9	38.5	45.8
51	33.6	48.1	41.9	41.2	52.7	37.9	14.7	2.3	17.5	44.8	20.0	4.6	-0.2	19.4	33.4
52	53.1	61.9	44.8	40.6	37.7	25.1	8.5	0.8	14.6	55.7	21.6	6.8	4.4	49.0	48.3
53	43.7	48.4	37.6	35.0	33.9	28.7	21.8	19.2	26.5	44.9	27.8	21.8	21.7	44.1	42.6
54	64.9	65.4	63.5	63.1	66.7	66.1	65.8	65.8	67.6	68.5	67.2	66.6	65.0	68.5	67.7
55	49.2	52.9	49.5	49.3	54.3	51.2	46.5	43.6	46.1	52.2	47.6	44.8	43.2	49.3	48.9
56	46.8	52.6	48.5	47.5	54.5	50.6	45.0	41.8	45.2	51.2	46.1	42.7	41.0	46.5	47.9
57	49.3	51.6	44.3	43.3	48.9	44.8	43.3	43.6	48.0	47.4	43.6	44.5	51.9	48.0	
58	55.1	60.4	58.4	57.2	63.5	57.2	52.9	53.7	56.9	62.9	54.1	54.1	51.1	58.8	57.8
59	49.5	53.9	50.7	49.9	56.2	52.1	47.4	44.9	47.6	53.6	48.7	45.6	44.1	50.2	50.3
60	47.2	52.6	44.8	43.3	51.0	45.1	40.7	39.6	44.8	47.7	41.3	39.7	39.6	48.6	46.9
61	45.6	51.8	47.6	47.1	51.2	46.9	41.2	38.3	42.8	50.3	52.3	40.8	38.6	47.9	47.3
62	51.9	50.5	54.0	53.5	46.9	53.2	49.5	49.7	58.4	55.9	75.9	47.4	56.2	55.1	53.9

Differential Temperatures (F)															
T2-T3	14.66	13.93	13.87	15.03	19.14	18.58	21.30	22.50	17.84	16.40	21.02	23.72	20.56	16.18	17.24
T5-T6	16.05	16.29	13.41	14.94	23.67	18.36	20.32	20.79	15.03	16.56	19.87	23.30	16.03	17.69	17.42
T7-T8	19.87	16.32	19.74	21.51	19.21	23.52	27.19	29.44	25.75	22.24	27.23	28.90	29.51	21.62	23.48

Flow Distribution (Pounds per Hour)															
W1	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
W2	184	181	180	180	186	183	179	183	185	183	182	181	185	180	184
W5	91	89	93	93	96	97	90	97	97	90	91	96	96	90	96
W7	102	103	103	102</											



## Test Data in Degrees F - Test Runs 57 Through 58

Thermo-couple No.	Elapsed Time (Minutes)													
	Run 57 (ID)							Run 58 (2A)						
	10	30	50	70	94	117	10	20	30	40	50	60	70	
1	83.5	83.9	83.5	83.7	83.7	83.7	65.4	64.9	65.7	65.9	67.5	66.6	65.2	
2	83.0	84.1	81.3	81.8	82.1	81.4	63.8	63.7	65.4	66.0	66.4	66.6	64.6	
3	53.5	55.6	54.5	60.6	62.6	56.4	38.1	37.6	37.5	37.4	38.2	35.1	35.1	
3A	54.6	56.7	54.0	58.9	61.5	56.7	41.3	38.9	39.2	39.7	41.1	39.3	37.8	
4	52.0	54.3	56.9	61.4	62.7	59.2	42.5	41.3	39.4	39.0	45.5	43.7	44.2	
5	83.2	83.4	85.7	83.1	83.4	85.9	69.0	67.2	66.1	66.2	68.3	67.1	65.6	
6	55.9	56.4	55.0	65.9	60.3	57.3	43.6	40.9	40.0	40.1	41.4	38.9	38.0	
7	83.9	84.5	84.4	83.1	83.4	84.7	68.0	66.5	66.4	66.7	68.1	68.1	66.2	
8	49.7	51.0	52.5	52.8	61.3	53.4	32.6	33.6	34.6	35.7	38.0	32.5	31.3	
A1-10	76.0	76.5	75.5	79.0	77.4	76.0	58.9	58.0	58.7	59.2	58.3	59.5	58.9	
A1-11	53.3	45.8	39.8	62.3	55.6	46.6	25.4	20.7	18.6	17.6	15.4	9.2	8.7	
A1-12	53.0	48.2	45.9	65.0	56.7	49.5	30.6	28.3	27.6	27.7	25.2	23.3	24.9	
A1-13	41.0	43.2	45.1	55.4	47.8	44.5	32.0	29.7	28.9	29.9	29.3	25.0	24.4	
A1-28	64.1	58.4	54.3	70.2	65.4	59.6	38.2	35.0	33.0	32.4	29.1	24.7	23.7	
A1-30	55.3	48.9	44.8	64.3	57.3	50.6	29.8	26.0	23.7	23.2	22.5	18.1	18.1	
A1-31	44.0	40.6	37.3	54.6	47.6	41.6	25.7	20.8	18.3	18.3	20.0	14.1	12.3	
A2-10	77.5	78.3	76.7	79.6	78.4	77.5	60.9	59.7	60.1	60.7	60.5	61.7	60.5	
A2-11	65.4	63.6	61.3	72.3	68.0	63.0	47.2	44.8	44.5	45.0	44.0	44.0	43.7	
A2-12	68.0	66.4	64.5	75.3	72.4	67.0	50.4	48.1	47.8	48.4	47.2	46.8	47.2	
A2-13	54.1	57.1	58.2	65.8	59.2	57.7	45.3	43.3	43.3	44.3	44.6	42.5	41.8	
A2-28	73.0	71.5	69.9	78.7	75.8	72.2	54.5	53.2	53.0	53.2	52.0	52.6	52.5	
A2-30	68.7	67.2	65.4	75.3	71.3	67.3	50.6	48.7	48.4	48.8	47.3	47.1	47.0	
A2-31	60.8	61.1	61.1	72.1	65.5	61.9	47.9	45.5	45.2	46.1	47.1	45.1	45.0	
B1-9	67.1	67.9	68.5	68.8	73.2	68.5	48.6	49.2	50.1	50.8	50.1	49.9	48.8	
B1-10	74.6	76.0	76.7	77.0	78.1	76.5	58.6	58.6	59.5	59.7	58.4	59.2	58.6	
B1-11	48.9	44.8	44.9	46.2	58.5	45.8	17.6	19.3	20.5	21.5	21.9	18.3	17.3	
B1-12	52.1	49.0	50.1	52.1	60.3	49.8	27.3	28.1	29.2	29.9	28.9	27.6	27.3	
B1-13	38.8	43.8	46.9	47.8	53.2	44.8	28.7	30.4	31.1	32.1	32.4	29.3	27.8	
B1-14	73.7	75.8	76.2	76.5	77.1	76.0	59.0	58.8	59.4	59.7	59.0	59.6	58.9	
B1-15	47.1	51.0	54.1	55.3	59.6	52.3	33.6	35.5	36.4	37.3	37.6	34.5	33.3	
B1-16	41.2	43.6	45.8	46.7	54.7	45.0	25.4	27.1	27.8	28.7	30.8	28.0	26.5	
B1-17	45.3	49.9	53.2	53.7	57.9	51.5	34.7	35.7	36.7	37.8	36.4	34.6	33.6	
B1-18	44.3	45.6	48.1	49.9	57.3	46.7	24.8	26.7	27.8	28.9	30.4	28.6	25.5	
B1-19	48.2	52.9	55.7	56.4	58.7	54.1	38.1	39.2	40.1	40.7	40.2	38.2	37.3	
B1-20	54.5	58.9	60.6	60.8	62.8	59.4	43.7	44.4	44.8	45.3	44.6	43.3	42.2	
B1-21	50.9	11.2	12.5	17.0	58.8	11.5	-37.8	-39.5	-40.1	-38.4	-29.7	-23.4	-15.1	
B1-22	21.1	0	-5.1	-6.6	19.7	-4.0	-66.9	-68.6	-70.2	-69.9	-64.8	-61.0	-54.4	
B1-23	5.4	-11.6	-12.9	-6.9	14.0	-8.3	-63.1	-65.4	-66.8	-68.5	-66.2	-63.1	-57.1	
B1-24	23.9	2.7	10.1	21.4	38.4	8.1	-30.5	-32.1	-32.9	-33.3	-28.6	-24.2	-17.2	
B1-25	41.4	24.5	21.2	23.1	48.9	24.5	-12.1	-11.0	-10.4	-9.1	-4.1	-3.9	-2.7	
B1-26	65.6	24.5	21.9	20.2	71.8	23.0	-32.0	-32.4	-31.5	-29.2	-21.1	-17.4	-11.5	
B1-27	75.5	28.9	18.5	15.3	70.8	23.9	-49.1	-50.0	-50.1	-48.8	-40.8	-35.0	-26.4	
B1-28	57.2	53.4	52.2	52.9	63.5	56.6	26.7	28.0	29.0	29.5	29.4	27.7	27.2	
B1-29	55.8	51.9	52.9	56.1	62.7	52.2	30.1	31.0	31.2	31.1	31.5	32.5	33.7	
B1-30	53.1	49.5	49.4	51.3	61.1	49.7	24.2	25.9	26.6	27.0	27.1	24.3	23.5	
B1-31	39.3	40.0	41.1	42.6	53.0	40.8	17.6	20.0	21.2	21.9	25.2	20.9	19.2	
B1-32	41.8	32.5	33.1	34.8	51.8	33.8	4.1	4.6	4.9	6.4	9.9	8.2	8.0	
B1-33	39.9	28.3	27.5	28.9	49.4	29.7	-3.2	-2.6	-1.8	-0.2	3.3	2.4	2.7	
B1-34	41.9	33.6	34.8	36.1	54.0	36.1	9.0	9.5	10.6	12.0	14.6	16.0	17.3	
B1-35	36.8	19.9	14.5	14.6	41.8	19.4	-25.7	-25.8	-25.0	-24.1	-19.4	-17.3	-14.1	
B1-36	32.2	15.9	20.4	27.6	47.1	19.1	-18.1	-19.1	-19.2	-19.2	-15.1	-11.5	-6.4	
B1-37	34.3	29.5	33.0	36.8	45.7	32.0	10.3	10.1	10.2	10.5	12.5	14.4	16.2	
B2-10	76.4	77.9	78.1	78.4	79.3	78.1	60.7	60.0	60.9	61.2	60.5	61.3	60.3	
B2-11	54.5	54.9	54.6	54.5	60.2	55.7	33.7	34.1	34.3	34.4	33.1	32.4	32.3	
B2-12	53.2	53.7	52.2	52.3	61.1	54.6	28.0	30.5	31.5	31.8	29.8	28.4	28.5	
B2-13	48.4	52.9	55.3	55.1	60.3	53.6	37.2	39.1	39.5	39.9	40.2	38.2	37.4	
B2-28	65.2	63.9	66.2	66.5	74.0	66.0	43.0	44.2	42.5	42.3	43.0	42.1		



## Test Data in Degrees F - Test Runs 57 Through 58 (Cont)

Thermo-couple No.	Elapsed Time (Minutes)												
	Run 57 (ID)						Run 58 (2A)						
	10	30	50	70	94	117	10	20	30	40	50	60	70
B2-30	56.0	56.3	56.3	56.3	63.4	57.9	34.4	34.5	34.6	35.0	32.6	31.8	31.5
B2-31	47.2	49.5	51.0	51.2	60.4	50.9	27.9	31.2	31.7	32.4	33.4	30.5	30.3
83	50.4	50.1	51.1	51.6	60.2	51.7	28.9	30.7	31.2	31.2	32.0	28.4	27.7
84	57.0	54.6	53.5	65.7	61.4	56.3	39.7	37.9	36.5	35.9	36.6	34.4	33.8
Differential Temperature (F)													
T2-T3	26.21	26.24	26.64	21.41	19.44	25.52	25.25	25.77	26.59	26.42	26.32	28.51	28.34
T5-T6	26.43	27.12	28.25	17.87	22.73	27.10	22.64	24.81	26.05	26.02	25.70	27.47	27.20
T7-T8	31.22	30.74	29.84	30.46	22.16	30.24	32.56	31.17	30.91	30.27	29.54	33.62	33.80
Flow Distribution (Pounds per Hour)													
W1	200	200	200	200	200	200	200	200	200	200	200	200	200
W2	187	189	183	187	189	187	181	180	181	182	130	128	124
W5	97	97	95	96	96	96	96	94	94	94	67	71	68
W7	103	101	99	103	103	107	93	103	97	97	80	74	75
Pressures (Pounds per Square Inch)													
P2-P3	-	-	-	1.16	1.16	1.20	1.33	1.60	1.60	1.60	1.20	1.20	1.21



## Test Data in Degrees F - Test Runs 57 Through 58 (Cont)

Thermocouple No.	Elapsed Time (Minutes)																	
	Run 58 (2A)																	
	80	100	110	120	130	140	160	180	200	220	240	260	280	300	320	340	360	
1	65.8	66.2	65.9	65.7	65.8	65.3	65.5	65.7	65.9	65.5	65.7	65.8	65.3	65.5	66.5	66.0	65.8	
2	65.6	66.1	64.5	64.1	64.8	64.6	63.9	64.1	65.8	65.7	65.3	64.4	65.0	65.5	66.2	65.1	64.1	
3	34.3	33.8	32.0	31.6	31.8	28.9	34.6	35.1	32.5	32.4	34.3	35.7	34.7	31.8	32.8	34.9	35.1	
3A	38.3	37.4	35.6	34.8	35.0	35.1	36.9	37.9	36.4	35.1	36.5	37.8	37.9	36.0	35.8	37.2	38.0	
4	43.6	43.0	44.6	45.3	44.0	43.3	46.5	47.2	43.2	42.1	44.0	46.8	44.2	41.9	43.9	45.6	47.3	
5	67.0	66.7	69.3	69.0	68.9	65.9	68.6	68.7	67.3	65.4	65.6	67.7	65.7	65.4	69.3	69.0	68.5	
6	37.8	37.1	36.3	35.6	36.2	36.7	38.7	39.0	37.2	36.0	37.3	38.8	38.2	35.7	37.9	41.7	38.8	
7	67.5	67.6	67.7	68.0	68.3	66.1	67.6	67.7	67.9	66.4	66.4	67.2	66.1	66.5	69.2	68.5	67.5	
8	31.5	29.5	27.8	27.8	27.5	28.3	27.6	30.8	28.0	28.3	30.2	31.5	30.0	27.8	28.7	30.8	31.1	
A1-10	59.0	58.6	57.7	57.6	57.8	57.9	58.6	59.1	57.7	58.1	59.1	58.3	57.3	58.2	58.6	58.9		
A1-11	9.1	1.7	-6.1	-12.7	-14.4	-13.7	-12.0	-10.2	-15.2	-17.1	-14.8	-11.4	-13.9	-18.4	-16.5	-13.2	-11.4	
A1-12	25.5	21.1	17.7	15.4	15.8	17.5	21.2	23.6	16.7	13.7	16.1	22.5	19.1	12.1	14.2	19.8	22.4	
A1-13	23.2	19.3	17.2	15.2	15.5	15.9	16.3	18.3	13.1	10.6	11.5	15.2	13.5	7.0	9.0	12.0	15.3	
A1-28	25.2	16.7	7.2	-6.2	-16.1	-21.0	-18.7	-12.4	-23.0	-37.9	-39.6	-28.0	-29.3	-46.9	-45.3	-36.5	-27.1	
A1-30	19.2	14.5	11.4	9.2	10.9	11.9	16.2	17.7	12.2	10.1	12.1	18.1	14.8	9.4	12.9	17.1	18.0	
A1-31	13.0	7.0	0.7	-7.4	-12.9	-16.5	-15.8	-11.4	-17.5	-27.5	-29.5	-21.9	-22.4	-32.3	-33.0	-27.7	-20.8	
A2-10	60.8	60.8	60.2	60.0	60.3	60.0	60.4	60.8	60.5	60.0	60.2	60.6	60.2	59.8	61.1	60.7	60.5	
A2-11	44.5	43.6	42.1	41.4	42.5	43.4	44.2	45.7	43.1	42.8	44.1	45.1	44.4	41.9	44.0	44.4	45.5	
A2-12	48.1	46.2	44.4	43.8	44.8	46.5	46.8	48.8	45.6	45.4	46.7	48.6	47.0	43.9	45.7	46.8	48.7	
A2-13	41.4	39.8	39.3	39.0	40.8	41.8	41.9	42.3	39.7	40.3	42.1	42.6	41.0	38.8	42.3	42.4	42.1	
A2-28	53.2	51.8	50.9	50.6	51.0	51.6	52.7	53.8	51.3	50.7	51.7	53.6	52.0	49.8	51.9	52.6	53.4	
A2-30	47.5	46.5	45.4	44.7	45.8	46.6	47.6	48.9	46.2	45.5	46.9	48.6	47.5	44.7	47.1	47.7	48.8	
A2-31	45.1	43.1	41.8	41.3	43.0	44.4	44.8	45.9	42.4	42.6	44.7	45.9	44.0	40.9	44.5	45.1	45.7	
B1-9	48.1	46.5	45.2	44.1	41.7	41.7	44.7	46.5	42.6	39.1	41.1	45.9	45.3	41.9	39.5	42.4	44.9	
B1-10	58.4	58.4	58.5	58.8	58.3	58.3	59.1	59.3	58.0	58.0	58.9	59.9	58.9	57.6	59.2	59.5	59.4	
B1-11	16.4	10.1	6.1	2.0	-2.7	-2.8	2.9	8.5	-0.2	-6.7	-3.8	5.5	5.6	-1.6	-6.2	-2.1	4.1	
B1-12	28.1	24.6	22.6	22.0	20.1	21.2	24.9	25.8	21.0	20.2	23.7	27.8	24.3	20.9	21.4	25.1	25.7	
B1-13	26.4	23.5	22.6	22.1	21.3	22.6	24.9	24.9	21.3	21.2	24.2	25.9	23.9	21.3	22.2	24.7	24.5	
B1-14	58.2	58.4	58.2	58.5	58.2	58.3	58.8	58.6	58.2	58.2	58.7	59.3	58.4	57.4	59.0	59.0	58.7	
B1-15	32.7	28.5	27.1	26.5	25.0	26.1	29.4	30.0	25.4	24.5	28.0	31.3	28.1	25.5	25.3	29.0	29.2	
B1-16	25.2	22.0	20.6	19.4	17.7	17.9	21.2	22.3	18.3	15.8	18.5	22.3	20.9	17.7	17.1	19.7	20.9	
B1-17	31.9	30.4	24.4	29.6	29.2	30.8	31.9	31.4	28.6	29.7	31.9	32.6	31.1	29.2	30.0	32.0	31.9	
B1-18	24.9	19.9	17.3	15.6	12.9	13.7	18.3	20.3	14.2	11.4	15.0	20.5	18.0	13.9	12.0	16.4	18.7	
B1-19	36.5	33.9	33.4	33.8	33.1	34.2	36.0	35.6	33.1	33.4	35.7	37.3	34.6	32.3	34.4	36.4	35.4	
B1-20	41.3	40.2	40.0	40.5	40.1	41.2	42.1	41.3	40.3	40.6	42.0	42.8	40.8	39.7	41.6	42.7	41.1	
B1-21	-14.7	-24.4	-29.6	-33.1	-35.4	-28.6	-18.8	-21.1	-32.8	-35.6	-23.5	-15.1	-25.1	-33.8	-29.2	-19.7	-21.6	
B1-22	-52.3	-50.0	-59.0	-61.9	-64.0	-60.7	-54.5	-54.9	-62.1	-62.5	-59.1	-52.6	-57.6	-64.0	-62.4	-56.6	-57.0	
B1-23	-52.1	-51.9	-55.4	-58.5	-61.7	-61.2	-54.8	-52.0	-58.8	-64.8	-61.0	-49.6	-51.6	-59.3	-61.0	-54.1	-50.0	
B1-24	-13.1	-16.4	-22.0	-25.8	-29.0	-25.9	-17.1	-16.0	-25.9	-31.0	-23.3	-11.0	-16.0	-25.7	-24.7	-14.1	-12.0	
B1-25	-2.7	-9.0	-12.8	-12.0	-16.0	-19.4	-17.6	-12.3	-10.0	-17.8	-16.4	-9.5	-12.5	-18.3	-19.8	-14.7	-12.3	
B1-26	-12.0	-21.8	-20.2	-29.9	-33.1	-27.5	-19.9	-21.3	-31.3	-34.6	-24.2	-16.8	-23.9	-32.7	-29.2	-20.9	-23.0	
B1-27	-25.2	-34.1	-38.6	-42.4	-45.9	-41.2	-31.0	-32.8	-43.6	-48.4	-37.0	-26.8	-36.9	-45.6	-41.8	-32.7	-34.5	
B1-28	26.7	21.4	18.6	13.9	8.0	6.4	14.5	20.3	11.1	0.1	3.6	17.2	17.0	8.7	0.9	7.3	14.7	
B1-29	34.0	31.0	30.5	30.0	28.6	29.0	33.4	32.9	29.8	28.2	31.3	36.1	31.7	29.4	30.5	33.8	33.5	
B1-30	23.5	18.0	15.5	13.4	10.9	11.1	14.9	17.7	12.4	10.5	12.5	17.3	15.3	12.0	11.1	13.5	15.8	
B1-31	18.1	13.0	10.0	7.5	3.7	2.8	8.2	12.2	5.6	-1.0	1.5	10.0	9.4	4.3	-0.6	3.8	8.1	
B1-32	7.4	2.5	-2.3	-5.3	-9.0	-6.3	-3.0	0.3	-6.4	-10.4	-5.9	-0.5	-1.5	-7.2	-10.0	-5.4	-1.3	
B1-33	2.4	-2.7	-6.9	-9.8	-13.2	-11.1	-6.7	-4.0	-11.4	-15.2	-10.0	-4.2	-5.9	-12.1	-13.8	-8.9	-6.1	
B1-34	17.0	12.8	10.9	9.7	8.1	10.1	14.3	14.4	8.8	7.0	11.8	16.1	13.0	8.2	9.4	13.9	13.6	
B1-35	-12.8	-18.3	-21.5	-24.8	-28.5	-28.0	-21.5	-18.7	-27.1	-33.3	-28.4	-19.2	-21.5	-28.9	-30.0	-25.4	-22.6	
B1-36	-2.7	-6.0	-11.5	-14.3	-16.9	-14.4	-6.1	-5.1	-14.4	-17.7	-10.8	-0.8	-6.0	-14.2	-13.4	-4.3	-2.1	
B1-37	17.4	15.5	13.2	12.0	10.9	12.1	16.0	16.2	11.8	10.4	14.0	18.7	15.8	11.6	13.0	17.2	17.4	
B2-10	60.1	60.4	60.4	60.7	60.2	60.5	60.8	60.7	60.0	60.0	60.8	61.1	60.6	59.5	61.3	61.2	60.7	
B2-11	31.7	31.0	30.8	30.6	29.9	31.4	33.2	32.0	31.2	30.5	33.1	34.6	32.1	30.7	32.6	34.3	32.5	
B2-12	28.0	25.5	25.3	25.2	24.4	25.7	29.6	28.4	25.8	25.4	28.9	31.4	27.7	25.7	27.3	30.4	28.7	
B2-13	35.8	34.0	34.0	34.5	34.4	36.2	37.6	35.4	34.7	35.4	37.8	38.3	35.1	34.3	36.9	38.3	35.9	
B2-28	41.3	41.9	38.2	37.9	37.1	42.1	41.1	39.9	40.1	41.7	44.2	42.0	40.7	39.7	42.9	43.9		
B2-30	31.1	30.3	29.7	29.1	30.8	32.8	31.8	30.2	33.0	34.4	32.0	29.9	32.0	34.3	32.7			
B2-31	29.0	26.3	25.5	25.7	25.3	27.6	30.6	28.7	26.2	27.0	30.5	32.0	27.8	26.2	28.5	31.7	29.5	
~3	28.1	25.8	24.2	24.2	23.6	23.1	24.7	26.6	26.8	25.2	26.0	28.4	25.0	24.4	25.0	27.7	28.0	
~4	34.0	33.9	31.9	31.3	32.1	34.5	34.9	35.7	33.9	33.4	35.5	35.2	32.3	34.5	36.1	36.4		
Flow Distribution (Pounds per Hour)																		
P2-T3	1.23	1.23	1.23	1.24	1.25	1.24	1.24</											



## Test Data in Degrees F - Test Run 59

Thermo-couple No.	Elapsed Time (Minutes)																		
	Run 59 (2C)																		
	10	20	40	60	80	100	121	140	160	180	200	220	240	260	284	300	320	340	360
1	70.4	71.5	71.5	71.2	71.3	70.7	70.9	70.7	71.3	71.4	71.3	71.3	68.9	71.2	70.7	70.7	70.9	71.2	71.3
2	69.7	69.3	71.3	70.7	70.8	68.8	72.0	70.1	70.7	71.2	71.3	70.2	68.7	69.3	69.7	69.2	69.9	69.4	70.8
3	34.3	35.2	37.3	38.7	40.3	39.5	35.9	38.1	38.8	39.1	37.3	36.7	38.5	39.3	38.3	37.4	37.9	38.5	39.1
3A	37.4	36.7	39.8	41.0	44.1	41.3	40.0	40.7	42.9	42.6	40.9	40.7	41.4	41.3	40.0	38.8	39.0	40.5	43.4
4	44.0	48.0	44.9	46.4	46.8	-	45.8	48.2	47.4	45.7	44.9	46.2	48.6	48.6	49.1	48.0	46.8	48.6	46.5
5	69.6	73.7	71.4	70.5	71.4	72.7	70.6	73.0	73.2	71.1	71.0	73.6	73.0	74.1	72.3	71.6	71.0	73.9	72.3
6	39.4	39.9	40.9	42.3	43.6	43.0	40.9	42.1	43.3	42.4	41.7	41.2	42.1	43.0	41.5	40.7	41.5	43.1	42.5
7	70.7	72.6	72.3	71.7	72.5	69.8	71.6	72.2	72.5	72.2	70.7	73.5	72.1	73.1	71.6	71.2	71.2	73.1	73.0
8	28.7	30.3	34.4	36.1	37.9	33.1	33.6	33.3	35.9	35.8	33.8	33.2	34.2	36.3	34.1	33.3	33.3	34.8	36.2
A1-10	61.3	62.3	62.9	63.6	64.2	63.7	63.9	63.0	63.1	63.9	63.8	63.2	62.6	62.9	63.1	63.1	62.7	63.8	
A1-11	-12.5	-14.8	-11.6	-8.3	-10.7	-13.1	-11.1	-10.0	-8.0	-12.4	-13.6	-11.9	-9.4	-12.3	-14.1	-11.1	-10.5	-9.0	
A1-12	20.7	19.2	18.1	21.7	27.5	25.9	21.4	22.6	23.8	25.9	19.9	21.6	25.1	23.1	20.5	22.4	23.5	25.7	
A1-13	14.3	12.7	12.8	15.7	19.9	19.8	13.9	16.4	17.3	19.4	16.5	14.0	16.4	18.8	17.4	13.6	15.5	17.1	19.4
A1-28	-27.6	-34.0	-45.0	-43.2	-28.7	-26.8	-41.3	-41.7	-33.3	-23.5	-29.5	-40.9	-40.3	-27.9	-30.0	-41.1	-42.5	-33.7	-23.9
A1-30	16.6	16.1	15.7	19.0	24.0	21.6	18.2	20.2	21.1	21.2	18.6	19.0	21.7	19.3	17.5	19.1	21.1	21.4	
A1-31	-20.2	-25.7	-31.5	-30.2	-19.9	-19.2	-28.3	-29.4	-23.2	-17.0	-20.5	-27.8	-28.6	-20.1	-21.6	-29.7	-30.1	-23.9	-16.8
A2-10	63.6	64.7	65.5	65.8	66.2	65.4	65.8	65.1	65.5	65.9	65.8	64.7	65.2	64.9	64.9	65.3	65.3	65.9	
A2-11	46.2	46.5	47.2	49.0	50.0	49.4	48.3	49.2	48.6	49.4	48.1	47.9	48.3	48.2	47.6	47.1	49.0	48.1	49.3
A2-12	48.9	48.9	49.4	50.8	52.5	51.3	48.9	50.5	50.9	52.8	50.3	49.1	50.3	51.8	50.3	48.5	50.9	50.7	52.5
A2-13	42.1	43.0	45.6	47.3	47.4	45.9	44.3	46.8	46.6	46.4	44.4	45.0	46.8	46.6	44.8	44.0	46.7	46.5	
A2-28	54.7	55.6	55.4	56.3	57.9	56.7	54.8	56.0	56.9	57.9	55.8	55.1	56.2	57.7	56.2	54.8	56.1	56.9	57.9
A2-30	49.3	50.2	50.3	52.0	53.1	52.7	51.1	52.3	51.9	52.7	51.3	50.9	51.7	52.1	51.2	50.4	51.9	51.8	52.4
A2-31	45.3	45.6	47.1	49.1	49.9	48.3	46.1	48.9	49.0	49.5	46.8	46.9	49.0	49.3	47.0	45.9	48.8	48.9	49.5
B1-9	44.4	43.9	39.1	42.0	48.9	50.7	48.6	48.1	51.4	52.3	49.9	48.1	51.1	53.6	51.9	50.5	49.7	52.4	52.9
B1-10	60.8	63.5	63.3	63.7	64.4	64.0	63.6	63.8	63.6	63.2	63.3	63.5	63.7	63.8	64.0	63.9	63.5	63.6	63.4
B1-11	-0.2	-3.6	-8.4	-4.6	-4.6	10.4	6.1	3.9	12.4	18.9	9.6	4.5	11.5	20.4	16.1	11.4	8.1	16.3	19.5
B1-12	22.8	23.7	24.9	28.4	31.9	29.7	28.1	27.3	29.1	29.7	27.5	27.2	28.8	31.4	29.7	28.2	27.4	29.6	30.9
B1-13	21.2	22.8	25.4	28.5	30.7	29.0	27.4	28.3	30.5	29.7	27.0	27.3	30.6	31.8	28.9	28.0	28.6	30.8	30.5
B1-14	60.2	63.2	63.5	63.9	64.0	63.6	63.4	63.7	63.6	63.3	63.4	63.5	63.7	63.3	63.4	63.4	63.6	63.3	
B1-15	25.2	26.2	28.4	32.2	35.9	34.1	32.3	32.3	35.3	35.4	31.8	32.0	35.2	37.6	34.2	32.9	32.8	36.0	36.3
B1-16	18.5	18.3	17.7	20.3	25.4	25.5	23.9	26.8	27.6	28.0	24.2	23.4	27.1	30.2	26.7	25.1	24.9	28.5	28.9
B1-17	28.9	32.4	33.8	36.7	37.9	36.4	35.0	36.3	37.0	36.4	34.7	34.4	37.1	37.8	36.3	35.7	36.3	37.2	36.5
B1-18	14.2	13.2	12.8	17.5	23.5	23.5	21.2	20.2	25.0	26.4	21.5	20.3	24.7	28.7	25.0	22.9	21.8	26.3	27.8
B1-19	32.9	35.9	38.4	40.6	42.4	39.8	39.0	30.7	41.0	40.0	38.2	39.0	41.2	41.9	39.6	39.2	39.7	40.9	40.5
B1-20	40.6	44.0	46.1	47.5	48.1	46.1	45.6	46.3	46.9	45.8	45.1	45.7	47.7	47.2	45.6	45.4	46.2	46.8	46.1
B1-21	-28.5	-32.7	-36.2	-23.8	-14.7	-24.5	-32.8	-27.5	-17.2	-19.0	-29.8	-33.9	-21.1	-11.9	-25.1	-31.0	-26.8	-16.8	-18.3
B1-22	-60.4	-63.9	-67.8	-61.2	-54.3	-59.6	-66.1	-63.6	-56.4	-56.4	-62.8	-66.2	-59.0	-51.5	-58.0	-62.7	-61.6	-54.3	-54.2
B1-23	-52.5	-56.9	-63.6	-60.4	-51.6	-47.9	-48.6	-55.7	-62.1	-59.1	-53.6	-61.5	-61.7	-53.0	-52.6	-58.6	-63.4	-62.1	
B1-24	-17.5	-23.3	-28.6	-21.6	-11.5	-8.4	-12.4	-21.7	-26.0	-20.1	-11.6	-17.6	-25.1	-22.3	-11.7	-14.4	-23.1	-26.8	-19.6
B1-25	-16.4	-18.7	-22.4	-16.8	-9.6	10.8	-13.7	-13.9	-7.2	-5.1	-11.5	-14.7	-8.1	-1.2	-6.6	-10.5	-11.6	-4.1	-2.5
B1-26	-28.5	-31.8	-35.8	-25.5	-16.8	-23.4	-29.8	-25.2	-16.8	-18.9	-27.2	-30.3	-18.3	-11.0	-20.8	-26.1	-23.4	-12.2	-15.3
B1-27	-39.8	-44.8	-48.9	-37.9	-27.5	-36.6	-44.5	-40.7	-30.7	-32.5	-41.7	-45.7	-33.7	-24.0	-35.7	-41.7	-39.5	-25.9	-28.2
B1-28	11.8	5.2	-7.4	-2.6	16.0	-	17.3	14.7	25.1	28.2	21.5	16.1	-	31.9	27.4	22.6	19.7	28.5	30.6
B1-29	32.4	33.1	34.0	37.0	39.8	37.3	37.3	34.3	35.0	35.7	36.1	36.0	34.8	36.6	36.4	35.7	33.7	35.3	36.4
B1-30	13.1	13.2	15.5	18.2	19.3	20.7	18.7	16.4	21.2	24.5	19.6	17.3	20.1	27.0	23.5	20.2	17.9	23.6	26.6
B1-31	5.6	1.9	-3.9	-0.4	10.1	14.1	11.6	9.4	16.6	19.4	13.5	10.6	16.1	22.2	17.8	14.5	12.5	19.4	21.4
B1-32	-5.9	-7.4	-11.9	-6.6	0.2	2.9	-1.4	-1.6	3.7	6.7	1.2	-2.9	3.2	9.7	5.8	2.0	0.8	6.6	8.9
B1-33	-10.3	-12.2	-16.4	-11.1	-3.6	-2.7	-6.9	-6.4	-0.8	1.1	-4.3	-8.1	-1.4	5.1	0.8	-2.9	-4.0	1.8	3.5
B1-34	10.6	9.9	8.2	12.5	18.8	19.7	12.3	14.3	18.8	18.1	13.2	11.9	17.9	21.4	16.8	14.5	15.2	19.1	18.7
B1-35	-25.2	-29.5	-36.4	-32.3	-21.6	-21.8	-26.0	-25.6	-17.3	-15.4	-22.2	-26.5	-18.7	-10.6	-16.4	-21.0	-22.2	-14.9	-12.6
B1-36	-7.9	-11.5	-14.8	-8.4	0.5	0.3	-2.7	-9.3	-11.9	-7.4	-3.6	-7.3	-11.2	-8.5	-2.6	-4.4	-10.4	-11.8	-6.6
B1-37	15.0	14.5	14.0	17.3	21.0	20.6	19.3	16.6	15.8	17.4	19.5	17.7	16.1	17.6	19.8	18.7	15.8	15.4	17.6
B2-10	63.1	65.5	65.8	65.6	65.9	65.7	65.4	65.6	65.5	65.1	65.4	65.5	65.4	65.4	65.5	65.5	65.5	65.4	65.0
B2-11	32.7	35.3	36.2	38.9	39.8	37.6	36.3	36.7	37.7	36.2	36.1	35.6	37.1	37.9	36.5	35.7	36.0	37.3	36.3
B2-12	27.4	29.7	32.0	35.6	37.3	33.6	29.7	31.5	34.7	33.3	30.6	30.4	33.2	35.5	32.1	30.6	30.9	34.2	33.3
B2-13	34.3	38.4	41.1</																



## Test Data in Degrees F - Test Runs 60 Through 61

Thermocouple No.	Elapsed Time (Minutes)																
	Run 60 (3A)								Run 61 (3A)								
	10	20	30	40	50	60	80	90	10	20	30	50	70	90	110	130	150
1	64.9	65.6	65.7	65.5	64.2	64.5	65.4	65.4	64.6	64.6	65.3	65.8	65.3	63.7	64.8	65.6	64.5
2	64.0	65.9	63.9	64.1	63.4	64.7	64.0	64.9	64.2	64.0	64.2	65.9	65.4	63.0	63.3	65.7	60.4
3	43.5	49.3	48.3	45.4	46.2	42.4	40.7	38.4	38.8	39.8	34.6	40.7	38.2	36.6	39.3	38.2	36.7
3A	44.9	49.0	51.6	52.1	49.7	45.9	43.7	42.8	40.9	41.9	43.1	44.2	41.6	39.4	41.3	41.9	39.6
4	45.6	47.2	52.8	53.5	50.0	46.5	41.7	46.5	46.3	47.2	48.0	46.0	45.3	46.8	48.8	45.0	46.1
5	66.9	64.6	68.2	68.0	65.8	67.1	66.2	66.8	65.7	65.8	67.4	65.9	64.6	65.9	67.7	65.9	67.0
6	49.1	51.6	53.5	51.4	51.1	49.2	47.7	47.1	46.5	48.1	50.5	50.3	46.8	45.7	50.1	47.4	45.5
7	67.7	66.3	68.0	67.8	63.6	67.0	66.9	69.8	65.1	65.3	67.6	66.7	65.6	65.2	66.6	66.8	66.9
8	38.7	45.3	48.5	46.0	38.8	35.2	32.0	30.4	28.8	29.4	28.9	29.7	26.4	24.2	25.2	26.6	24.6
X1-10	61.0	62.2	61.8	61.4	60.2	60.0	61.1	61.3	60.9	60.7	61.0	60.9	60.7	60.3	61.7	60.8	59.4
X1-11	39.2	45.3	47.0	46.6	43.8	40.3	37.5	33.6	33.4	37.2	41.3	41.3	34.8	29.5	38.4	34.7	29.9
X1-12	41.9	46.8	48.2	47.2	44.6	41.4	40.3	38.2	39.5	42.0	43.9	42.8	38.7	37.0	43.7	38.9	34.7
X1-13	41.9	44.3	45.6	44.2	42.2	39.8	39.1	37.1	38.2	40.4	41.6	39.8	37.0	35.3	40.2	36.7	34.9
X1-28	49.2	52.0	54.5	53.9	51.4	48.8	46.4	43.7	44.0	47.1	50.1	49.5	44.7	40.9	48.1	44.6	41.5
X1-30	41.7	46.3	49.3	48.4	45.3	42.2	39.7	36.7	36.7	39.8	43.3	42.4	36.9	34.4	42.0	37.3	33.5
X1-31	38.7	42.6	45.3	44.0	40.5	38.4	35.9	34.1	33.2	36.5	40.4	38.5	33.4	29.9	37.4	33.9	31.1
A2-10	62.5	62.8	62.9	62.5	60.8	61.2	62.0	62.5	61.4	61.3	62.3	61.7	61.3	60.9	62.6	61.9	60.7
A2-11	54.7	57.5	58.2	57.7	55.3	53.9	53.7	53.3	53.7	55.4	57.1	55.8	53.1	51.4	57.3	54.5	51.7
A2-12	58.6	61.6	62.9	63.3	61.1	58.8	57.2	55.8	56.0	58.3	61.3	61.7	57.3	52.6	59.9	57.6	54.5
A2-13	52.7	53.8	54.5	53.9	51.4	49.8	49.8	48.5	48.7	50.6	52.3	50.9	48.1	46.3	51.7	48.7	47.4
A2-28	59.8	61.5	63.0	63.3	61.5	59.6	58.4	57.3	57.3	59.1	61.3	61.5	58.3	55.2	60.5	58.2	56.2
A2-30	56.9	59.3	60.6	60.7	58.5	56.4	55.7	55.0	55.6	57.2	58.9	58.5	55.4	53.9	59.0	56.1	53.7
A2-31	57.7	59.4	60.6	60.4	57.3	55.0	54.1	53.2	53.8	56.3	58.7	57.6	53.7	51.0	58.0	54.0	52.2
B1-9	48.4	56.3	58.1	55.8	52.6	49.9	48.1	45.1	44.2	44.0	43.6	44.2	39.1	21.5	-1.7	-14.9	-22.7
B1-10	60.1	60.9	61.3	60.6	58.9	57.5	58.1	58.9	60.0	59.5	58.6	58.5	57.6	56.7	52.5	57.3	56.1
B1-11	10.1	42.0	49.7	43.5	34.5	27.2	19.3	9.9	7.6	6.6	5.2	4.0	-6.8	-17.7	-16.7	-16.9	-20.3
B1-12	39.2	48.0	50.8	46.7	37.0	30.1	27.2	25.8	29.8	30.5	28.7	25.4	18.0	13.2	18.3	15.6	9.6
B1-13	34.4	41.2	43.5	39.4	32.2	27.1	24.8	20.7	21.2	23.0	23.6	24.7	19.9	13.6	7.6	4.2	-0.3
B1-14	60.2	60.6	60.9	60.1	58.5	57.4	57.9	57.8	58.0	58.0	58.1	58.3	57.3	56.5	57.4	57.3	56.2
B1-15	40.5	47.9	50.3	47.6	38.6	32.8	29.6	25.3	26.6	28.9	29.3	29.5	22.8	14.3	7.2	3.3	-2.0
B1-16	27.3	40.7	45.0	40.2	32.7	27.2	23.0	19.6	19.4	20.5	20.4	20.6	15.4	5.8	-3.4	-8.4	-11.4
B1-17	39.8	44.3	45.2	41.2	36.4	32.2	32.1	28.5	28.1	29.7	30.2	32.4	27.6	24.9	22.1	21.4	18.1
B1-18	30.1	45.0	49.0	45.2	35.0	27.5	22.1	17.3	18.3	20.3	20.1	19.0	9.9	-1.8	-9.1	-13.6	-18.6
B1-19	44.1	47.2	48.3	45.9	39.4	35.2	34.3	31.4	32.9	34.3	34.5	35.6	31.5	28.1	25.2	23.4	19.9
B1-20	48.1	49.3	50.1	47.4	43.1	40.7	40.7	38.6	39.7	40.6	40.2	41.5	39.2	37.6	37.4	37.3	35.7
B1-21	34.3	62.6	64.3	37.5	14.0	-4.5	-28.2	-25.1	-25.8	-32.0	-35.9	-40.9	-46.8	-51.9	-57.2	-62.7	-67.6
B1-22	-20.2	3.9	12.7	0.6	-11.1	-22.9	-41.8	-42.2	-46.0	-52.3	-58.4	-66.2	-73.6	-79.8	-85.8	-91.9	-97.5
B1-23	-28.7	-16.7	-20.0	-28.0	-35.6	-43.5	-33.5	-10.1	-3.3	-2.5	-14.3	-37.4	-54.7	-66.2	-38.3	-51.1	-64.0
B1-24	11.6	27.2	14.6	0.8	-10.5	-19.6	-0.1	31.7	43.1	29.2	10.8	-10.4	-12.0	-15.6	-23.4	-33.0	-36.5
B1-25	8.9	33.3	46.4	35.0	18.8	6.8	-6.0	-9.5	-9.1	-10.4	-12.0	-12.9	-23.4	-33.0	-36.5	-38.8	-42.6
B1-26	35.0	62.3	76.0	44.2	20.2	2.5	-17.8	-15.9	-19.3	-23.5	-26.8	-31.3	-38.9	-47.1	-52.3	-55.6	-60.6
B1-27	29.6	59.4	75.6	46.3	20.9	0.5	-24.8	-25.0	-26.7	-33.0	-38.4	-44.9	-52.0	-58.9	-64.0	-68.6	-72.4
B1-28	22.2	47.0	53.6	48.0	41.3	-	28.5	20.4	18.6	16.5	14.4	14.1	1.4	-29.8	-55.0	-68.9	-76.1
B1-29	45.6	50.7	50.5	46.1	37.2	-	32.8	30.2	44.9	44.0	39.2	32.9	27.0	24.0	34.6	28.6	24.0
B1-30	25.8	46.5	51.5	46.9	37.6	30.6	24.9	18.8	19.8	20.2	18.2	15.4	9.1	8.2	17.1	15.4	9.9
B1-31	12.9	38.5	45.3	39.6	30.5	22.9	15.8	10.8	10.0	10.1	8.7	8.7	0.7	20.0	-38.3	-50.2	-55.3
B1-32	11.9	37.0	45.9	37.3	24.2	16.2	6.9	1.3	0.9	0.7	0.2	-3.4	-12.9	-22.4	-23.0	-23.6	-28.6
B1-33	10.0	34.3	44.7	35.2	21.4	11.4	0.8	-3.0	-3.2	-4.1	-5.1	-8.3	-17.2	-26.6	-28.9	-30.1	-34.7
B1-34	27.3	40.6	46.6	37.4	26.5	18.4	10.5	9.5	10.9	9.8	9.3	8.9	4.0	-3.2	-14.1	-20.8	-26.1
B1-35	-6.6	22.3	39.7	30.3	15.9	2.8	-13.4	-17.5	-17.4	-21.3	-25.1	-28.4	-37.0	-50.1	-66.4	-78.1	-85.8
B1-36	20.5	34.5	28.4	18.0	4.6	-6.2	2.4	24.4	35.8	28.4	14.9	-5.1	-18.2	-25.0	3.8	-12.7	-23.7
B1-37	27.4	34.7	31.1	24.2	17.2	12.0	16.8	28.4	34.5	30.7	23.7	14.6	0.0	7.0	20.5	11.9	6.8
B2-10	61.3	62.2	62.4	61.2	59.9	-	59.7	60.4	60.9	60.5	60.4	60.1	50.0	58.4	60.1	59.7	58.6
B2-11	43.2	47.1	49.8	46.3	41.3	-	35.1	32.9	34.1	33.3	32.3	32.0	28.7	27.4	29.7	29.4	28.3
B2-12	42.0	46.4	50.2	47.6	41.7	36.8	31.8	25.4	25.8	25.4	25.0	26.3	22.3	20.4	19.6	20.6	19.3
B2-13	46.7	48.0	48.6	42.6	36.0	33.9	33.8	31.3	34.0	34.4	34.6	35.9	33.2	32.3	32.9	34.3	33.3
B2-28	50.8	53.7	56.5	54.3	49.5	46.5	43.5	39.0	39.0	38.7	39.2	39.9	36.7	35.4	34.6	35.9	34.6
B2-30	43.9	48.0	50.6	47.8	42.5	39.4	36.0	23.7	32.8	31.7	31.9	31.2	27.6	26.4	28.5	28.9	26.8
B2-31	43.6	47.1	49.1	43.1	34.7	30.9	28.0	32.5	26.2	26.8	27.6	23.3	21.6	21.7	23.4	22.3	22.3
83	37.3	44.4	47.9	45.3	38.4	33.7	29.9	25.4	26.5	27.5	26.1	26.2	23.3	21.2	23.4	23.7	21.2
84	46.5	49.8	51.4	51.4	48.8	47.1	45.7	43.3	43.8	46.3	48.4	48.1	44.7	42.5	48.6	45.4	42.6
Differential Temperatures (F)																	
T2-T3	18.35	14.22															

## Test Data in Degrees F - Test Run 62

Thermocouple No.	Elapsed Time (Minutes)																							
	Run 62 (3B)																							
	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480
1	82.1	83.0	83.1	83.1	82.7	83.2	83.1	82.4	83.8	83.3	83.2	83.7	83.1	83.3	82.8	83.3	82.4	82.5	83.4	82.7	82.2	83.1	82.7	83.1
2	79.3	80.5	80.5	82.4	81.1	80.7	79.4	80.4	81.9	81.4	82.6	82.5	82.0	81.9	80.5	81.7	79.7	81.4	80.6	80.7	83.0	82.9	81.2	
3	45.0	52.0	51.5	53.7	61.6	57.4	53.9	54.7	61.7	60.6	56.1	54.5	59.0	61.8	59.2	53.6	53.5	60.0	61.0	57.6	55.2	55.8	55.2	60.3
3A	43.7	53.7	53.4	55.8	62.2	58.2	53.7	54.6	61.3	62.2	55.7	57.3	56.7	60.1	59.0	55.7	52.0	57.6	62.8	59.7	54.3	56.7	58.0	62.1
4	51.1	54.2	53.7	56.7	61.8	59.7	55.5	55.7	58.6	61.8	59.5	54.2	55.2	62.8	58.6	54.4	53.8	60.9	60.8	60.5	55.2	53.7	59.6	60.3
5	84.3	84.7	84.7	82.3	83.1	85.3	85.1	84.4	83.5	83.7	82.4	83.6	82.3	84.0	83.6	84.7	82.5	83.5	84.1	-	84.1	82.4	85.1	84.2
6	46.7	53.9	54.8	63.0	59.9	59.8	61.8	64.9	63.6	61.3	59.9	60.5	62.1	60.6	57.4	55.3	57.2	64.0	61.7	53.7	52.2	56.0	64.2	
7	83.0	84.3	84.1	82.3	82.7	84.4	85.1	83.4	84.6	83.1	82.8	84.4	82.6	83.3	83.0	84.9	82.0	82.7	84.5	83.2	83.1	83.4	84.3	84.6
8	44.4	49.9	48.9	48.3	56.7	52.5	47.0	45.4	56.6	55.1	48.6	47.6	51.1	59.3	51.7	48.0	48.9	61.1	56.1	50.6	49.7	60.6	59.5	54.3
A1-10	72.4	74.5	74.7	78.0	77.6	76.6	75.5	77.0	78.4	77.2	76.7	77.0	77.5	77.6	76.3	75.8	75.6	78.7	78.5	75.3	74.7	76.3	75.7	75.8
A1-11	22.2	33.6	38.4	55.2	54.3	48.2	46.9	51.1	56.5	54.7	59.7	49.4	50.8	48.0	42.2	39.2	40.5	55.6	53.0	37.5	27.5	40.6	59.2	
A1-12	35.1	42.5	44.5	59.3	57.9	52.2	50.9	55.5	59.2	57.2	53.6	51.1	54.4	55.6	51.9	47.5	47.0	52.4	60.9	54.5	44.8	41.6	49.7	60.1
A1-13	30.7	43.0	46.4	54.5	53.6	49.4	50.2	54.6	55.2	53.4	51.8	49.7	52.5	53.2	49.8	46.3	45.8	47.3	56.1	46.6	39.4	36.5	46.7	50.8
A1-28	41.1	49.4	53.1	64.2	64.1	59.9	58.5	62.0	65.3	64.5	61.0	58.4	59.9	61.6	59.5	55.2	52.5	54.0	65.2	63.7	52.4	46.1	55.2	68.3
A1-30	30.7	40.3	43.3	58.7	58.1	52.7	51.0	55.3	59.5	57.7	53.3	51.0	53.1	54.9	51.7	47.1	44.5	50.6	60.5	66.0	43.9	35.9	47.1	61.4
A1-31	23.1	33.6	38.2	50.8	50.1	45.7	45.5	49.6	53.5	50.7	47.6	45.1	46.8	48.4	44.9	40.8	37.1	39.3	53.4	46.3	34.1	26.8	39.1	51.5
A2-10	74.8	76.6	76.6	78.3	78.0	78.1	78.3	79.5	-	77.8	78.4	78.2	78.3	77.4	77.6	76.6	79.1	79.8	77.0	76.3	77.6	77.6	77.7	
A2-11	55.8	59.0	59.3	69.2	69.2	66.4	65.8	68.0	71.9	69.7	67.3	66.2	67.7	68.6	66.3	63.4	62.0	66.4	72.8	66.8	61.7	63.5	66.3	70.1
A2-12	58.0	61.2	61.8	72.0	72.1	68.8	68.1	70.4	74.8	73.8	71.2	69.0	69.9	71.1	69.9	66.0	63.9	64.5	72.7	72.5	63.9	61.4	65.1	76.4
A2-13	50.2	58.1	59.0	65.7	63.8	61.3	62.2	64.9	66.3	64.0	63.1	62.1	63.4	63.9	61.9	59.8	58.6	60.0	65.9	59.9	54.9	54.2	37.6	63.4
A2-28	65.6	67.6	67.9	74.9	74.7	72.5	71.7	73.4	76.3	76.0	73.7	72.1	72.5	73.6	73.0	70.6	68.7	69.5	75.0	76.1	70.0	67.1	-	79.3
A2-30	59.6	63.3	63.4	72.5	72.5	69.6	68.9	71.2	74.3	72.9	70.0	69.3	70.3	71.3	69.7	66.9	65.4	68.9	73.9	71.3	65.8	65.6	-	74.5
A2-31	53.9	59.5	60.3	70.3	68.6	65.2	65.4	68.8	71.6	69.6	67.5	65.9	67.3	68.2	66.5	62.7	61.0	62.7	70.5	66.3	58.7	57.1	-	70.8
B1-9	4.6	13.6	5.8	2.9	61.7	67.2	63.6	62.9	71.0	69.5	65.4	63.9	69.2	71.8	67.1	64.4	68.1	73.4	69.2	66.3	64.4	73.0	-	68.8
B1-10	74.7	75.8	74.9	75.9	78.6	76.3	75.0	76.6	76.8	76.4	75.7	76.4	75.9	77.6	75.8	75.2	76.4	76.3	75.4	76.3	75.7	-	75.7	
B1-11	1.0	1.5	-2.6	-1.1	14.7	41.2	31.9	28.2	54.1	49.9	37.9	32.5	48.1	55.8	43.0	34.8	46.2	62.6	50.7	40.6	39.3	60.2	56.2	48.7
B1-12	39.5	41.5	36.0	37.6	57.1	51.3	42.5	45.7	57.5	54.1	48.1	47.4	49.1	57.1	52.5	46.3	47.2	60.7	58.2	49.4	46.7	58.1	60.1	52.0
B1-13	20.2	32.9	29.1	28.1	48.2	45.4	38.7	38.3	50.5	48.2	40.1	39.3	44.2	52.2	43.8	39.8	42.9	55.7	49.5	43.5	44.0	54.2	54.1	49.1
B1-14	73.6	75.0	74.5	75.2	77.3	75.4	74.6	75.2	76.5	75.8	75.1	75.2	75.4	76.5	75.8	75.0	74.7	76.5	76.2	75.4	74.9	76.3	76.4	75.7
B1-15	23.1	34.3	28.3	25.5	54.6	53.1	44.6	44.4	57.7	56.6	46.9	45.8	49.6	60.4	51.1	46.6	47.8	63.3	57.6	50.6	50.5	60.9	61.9	55.9
B1-16	5.2	13.0	8.7	7.2	38.5	44.4	37.2	35.9	50.7	42.2	39.3	37.1	44.7	53.0	43.5	38.5	43.0	57.3	49.6	42.7	42.7	55.6	54.9	48.5
B1-17	37.7	44.4	42.9	43.5	55.4	49.5	46.1	44.8	55.9	52.5	47.6	47.2	51.9	56.3	49.7	46.7	49.4	58.9	53.6	49.3	49.6	59.0	56.2	54.6
B1-18	15.0	7.6	5.5	41.9	47.6	37.3	36.4	54.2	52.1	40.7	39.0	44.7	56.5	46.3	40.0	42.9	60.9	54.0	44.8	44.0	57.7	59.0	51.2	
B1-19	42.1	48.8	46.0	45.4	59.0	53.9	49.0	49.2	58.1	56.5	50.1	49.7	52.2	59.5	52.8	50.0	58.8	61.9	57.1	52.5	52.7	60.4	60.6	56.4
B1-20	54.8	57.9	57.0	57.9	64.3	58.5	56.0	56.5	62.5	59.9	56.2	56.4	59.0	62.7	57.9	56.6	57.7	64.4	60.3	58.1	58.6	63.9	63.0	60.5
B1-21	20.3	-41.7	-50.6	-23.0	52.0	12.7	-17.1	-11.7	63.5	34.1	-4.5	-9.0	62.5	46.1	7.0	-16.0	51.7	63.8	22.0	-4.6	17.5	57.3	34.7	12.8
B1-22	75.5	82.2	88.4	70.5	-15.1	30.7	-46.6	-43.2	8.0	-1.8	-23.8	-30.2	14.7	10.4	-11.7	-30.1	12.0	24.1	-0.2	-19.6	-11.2	14.4	3.8	-10.9
B1-23	21.3	-32.1	-46.2	-30.4	15.0	-7.1	-9.5	19.7	0.3	-18.4	19.7	19.7	-9.0	-17.2	22.4	7.5	-15.2	-24.6	19.4	8.7	-9.9	-12.8	-1.6	-19.6
B1-24	22.5	7.0	-13.7	8.9	60.3	16.9	19.9	58.9	23.3	3.5	61.4	45.8	6.7	9.7	64.6	30.3	1.6	-0.6	61.8	33.3	10.1	13.1	27.3	3.2
B1-25	14.1	-18.5	-25.6	-21.3	20.1	20.0	5.0	3.4	41.1	34.5	14.0	7.0	32.8	42.6	21.8	9.2	31.3	54.6	32.2	15.9	13.7	48.4	40.2	26.0
B1-26	16.2	-31.5	-41.1	-19.3	50.2	14.0	-8.7	-0.5	67.7	40.0	6.7	1.1	61.4	53.0	18.0	-1.7	62.7	72.8	29.8	6.0	13.8	69.2	41.9	20.4
B1-27	48.2	-41.8	-52.8	-35.1	9.8	-17.6	-12.6	62.3	40.7	3.6	-7.6	58.5	48.4	16.7	-7.4	60.8	76.5	29.3	1.6	3.9	66.9	39.4	15.2	
B1-28	52.0	-57.9	-59.4	-59.4	24.2	48.4	41.8	39.2	59.5	56.7	46.9	41.7	57.2	62.1	50.8	44.1	55.2	67.0	56.1	49.1	48.3	65.9	61.3	55.1
B1-29	38.5	42.3	36.8	38.2	44.2	49.9	40.6	41.2	57.1	51.7	46.2	43.3	49.9	58.6	50.8	44.6	48.0	63.1	57.6	48.6	48.6	65.0	69.2	52.0
B1-31	-27.7	-34.4	-35.9	17.5	39.7	30.3	27.7	48.1	45.3	33.9	29.9	40												